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FIG. 1

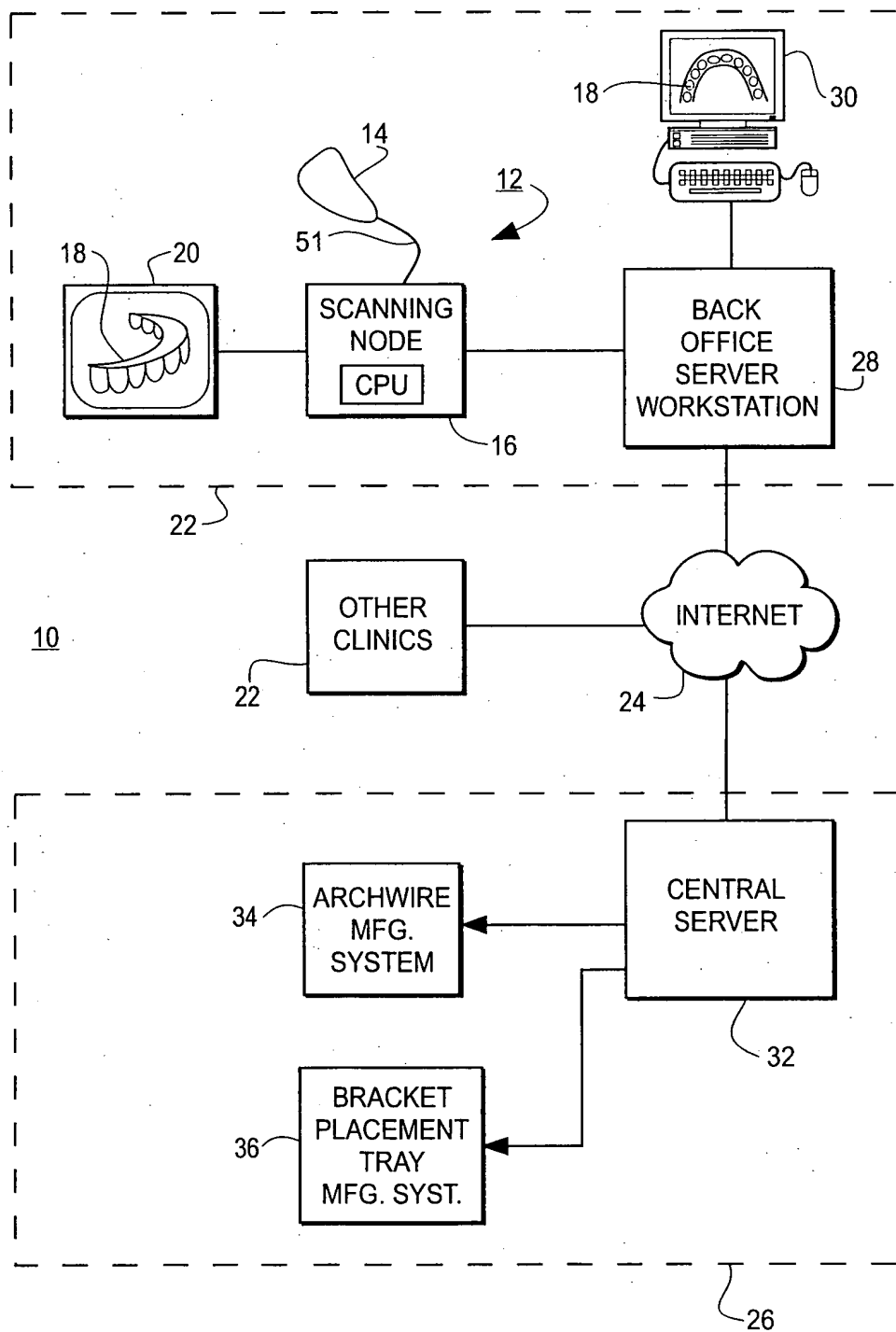


FIG. 2

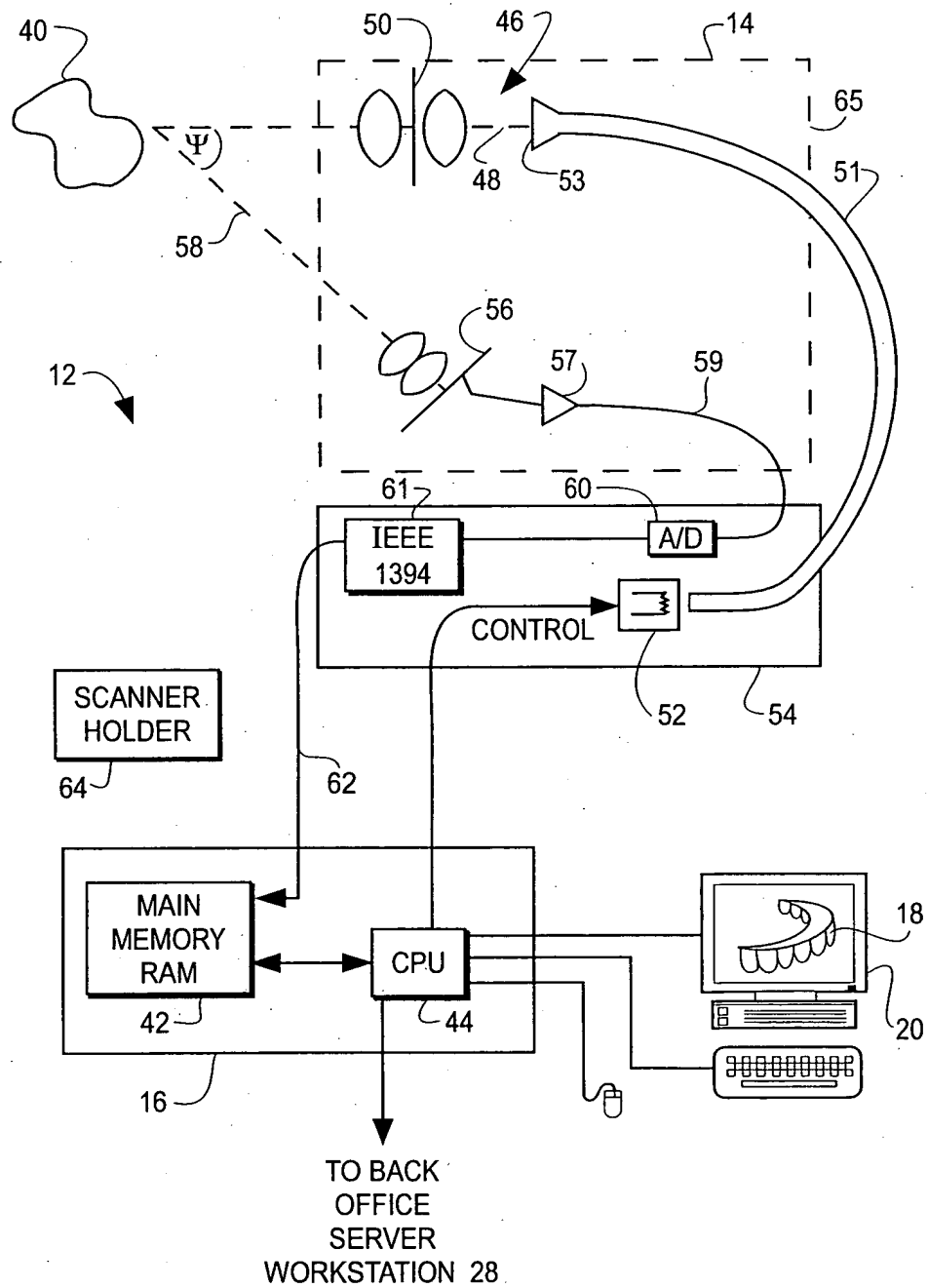


FIG. 3

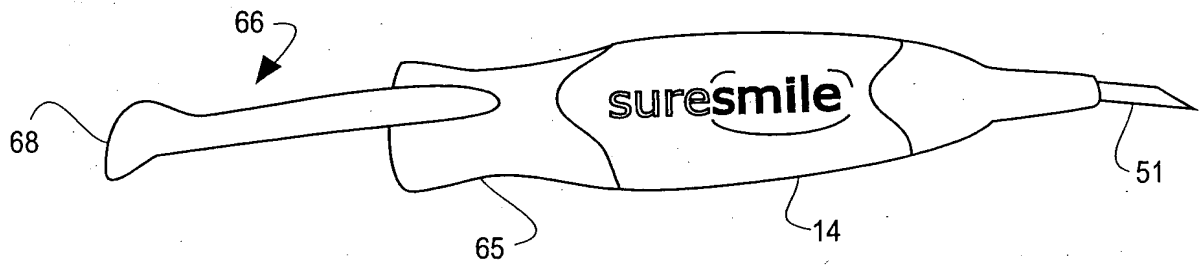


FIG. 4

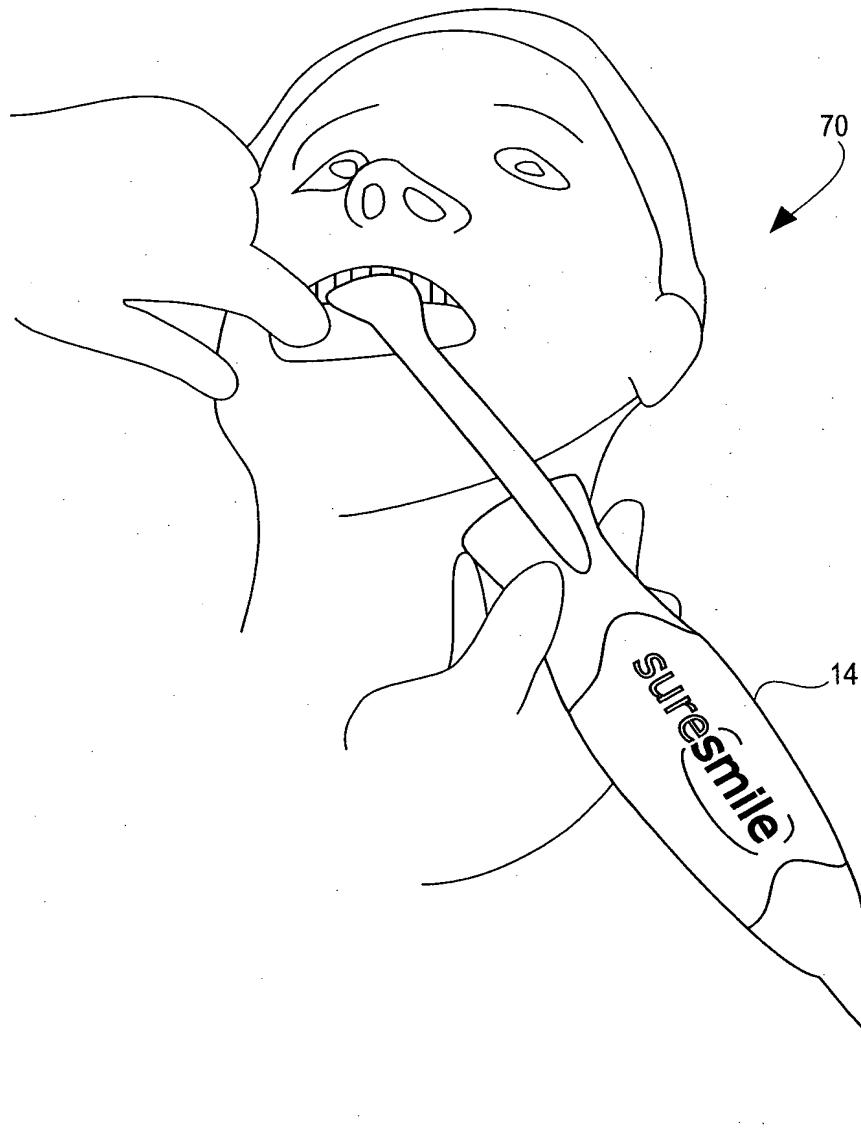


FIG. 5

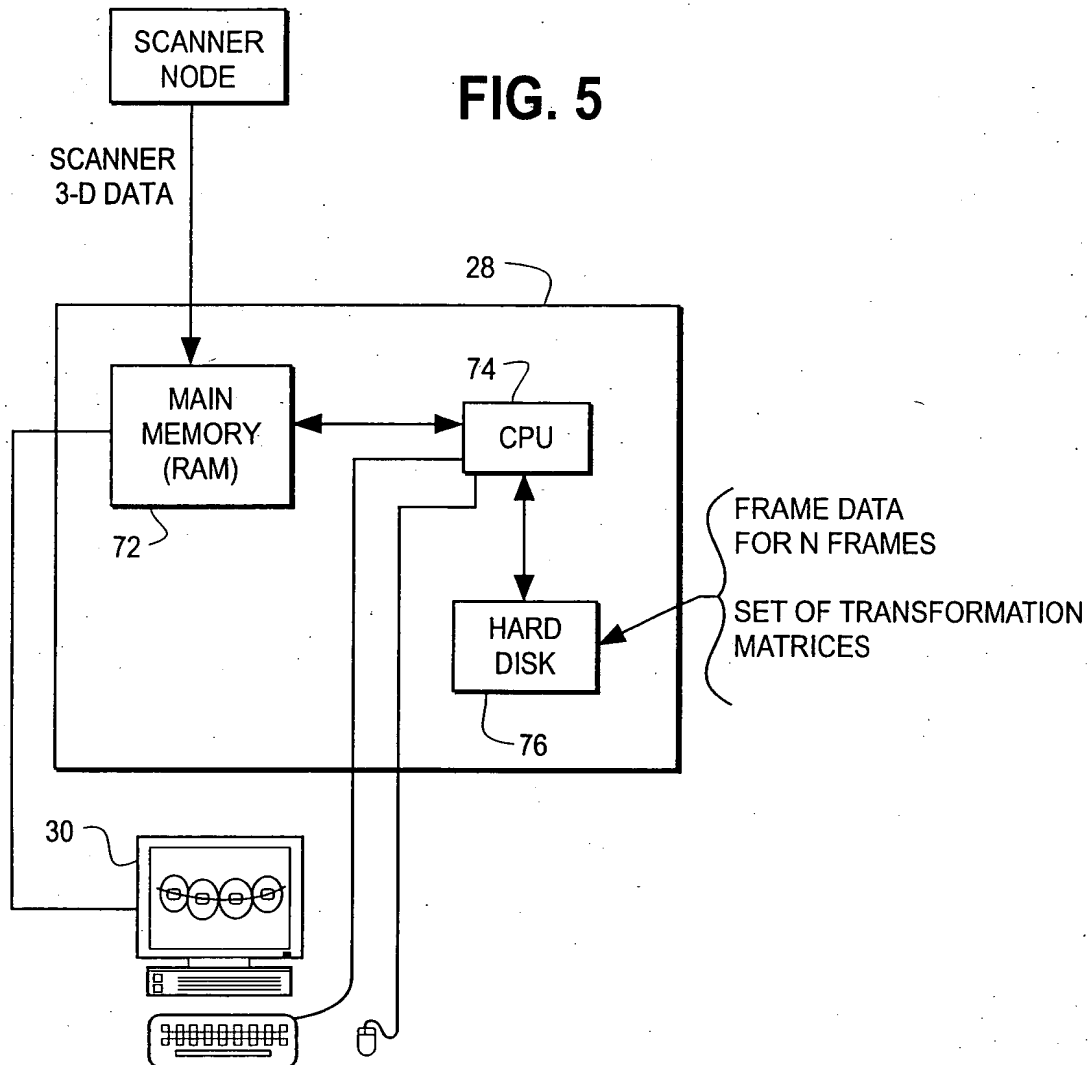


FIG. 6

3- DIMENSIONAL IMAGE CAPTURE
(PER FRAME)

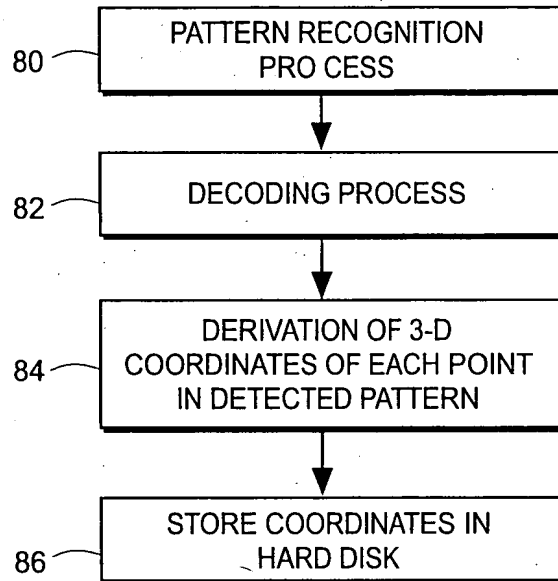


FIG. 7

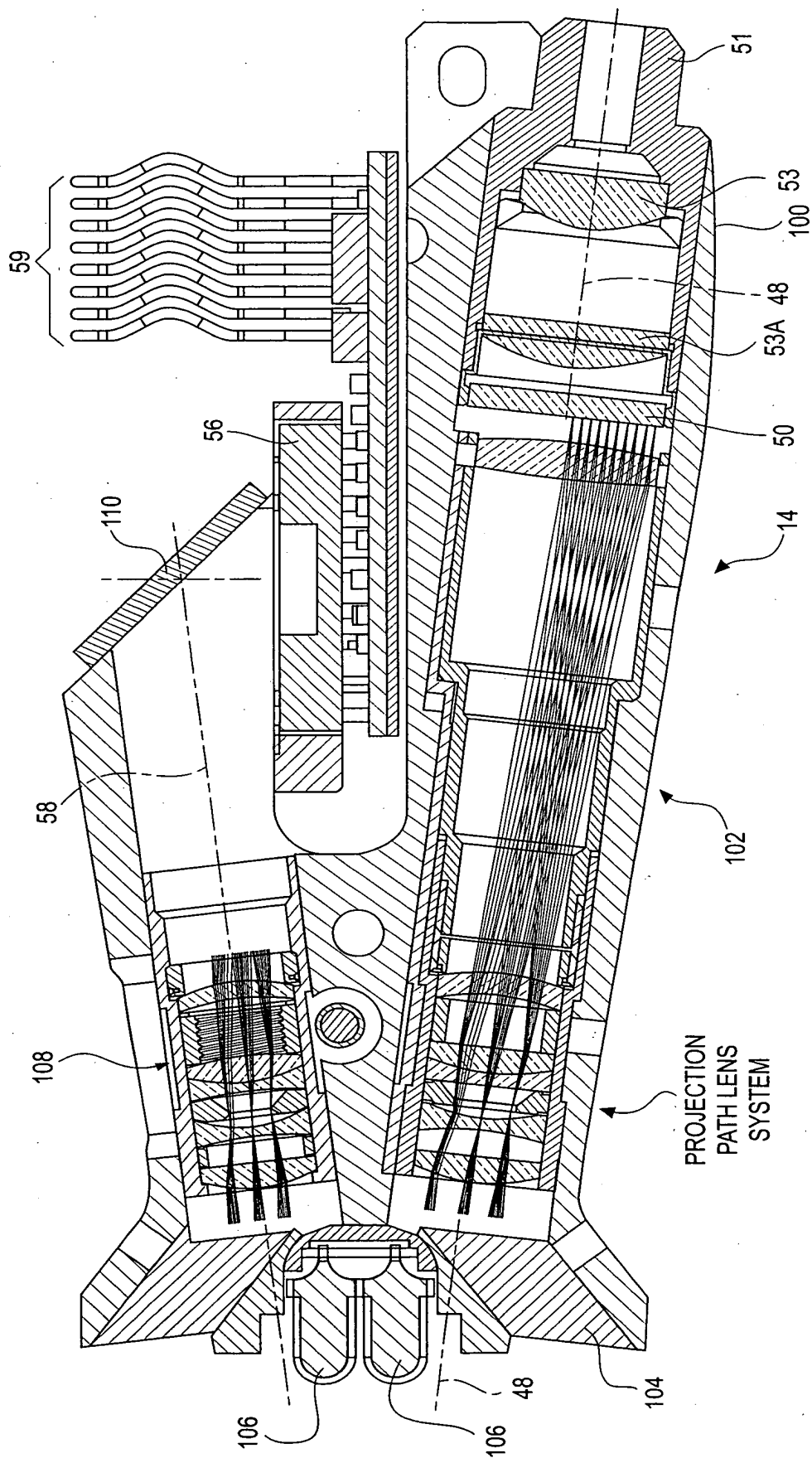


FIG. 8A

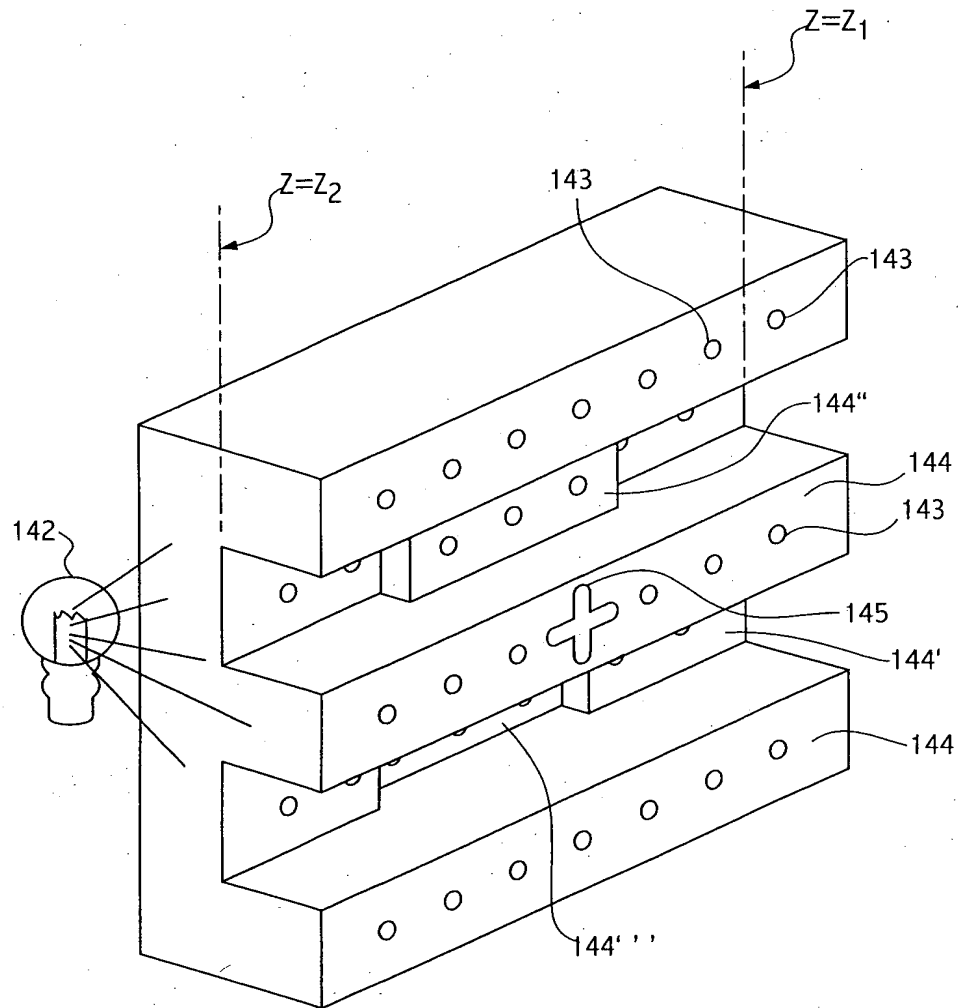
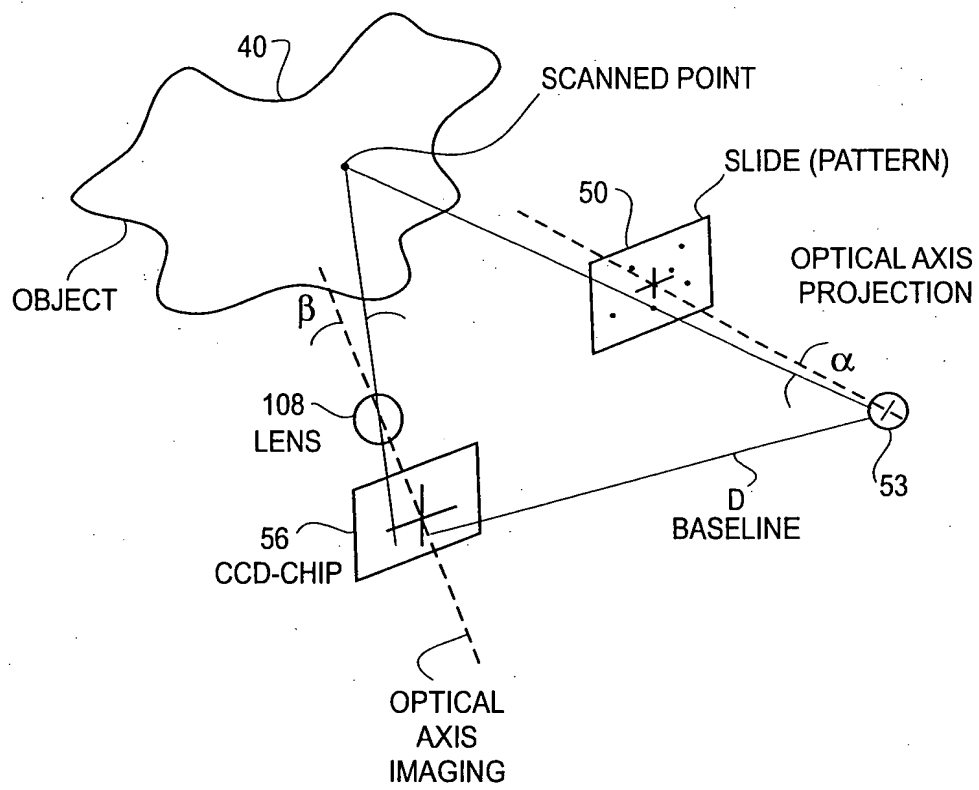


FIG. 9

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FIG. 9A

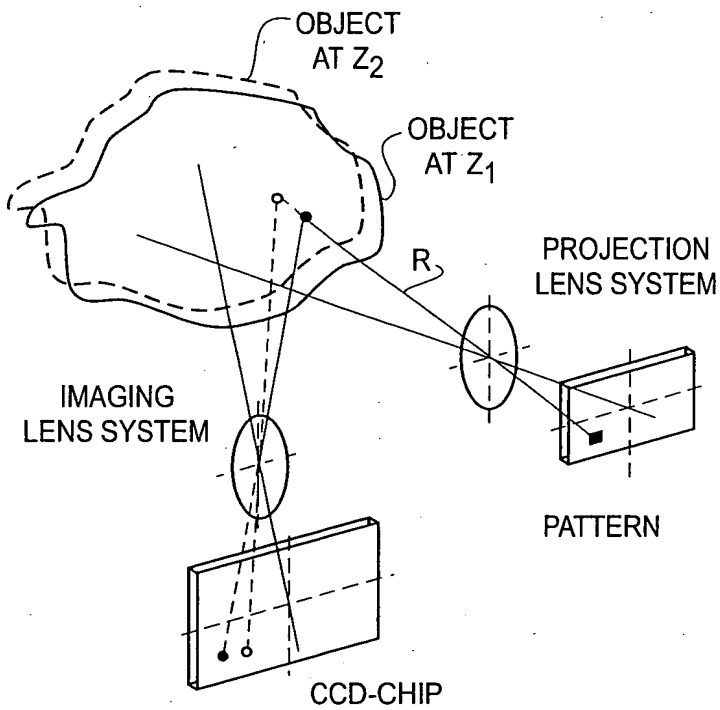


FIG. 9B

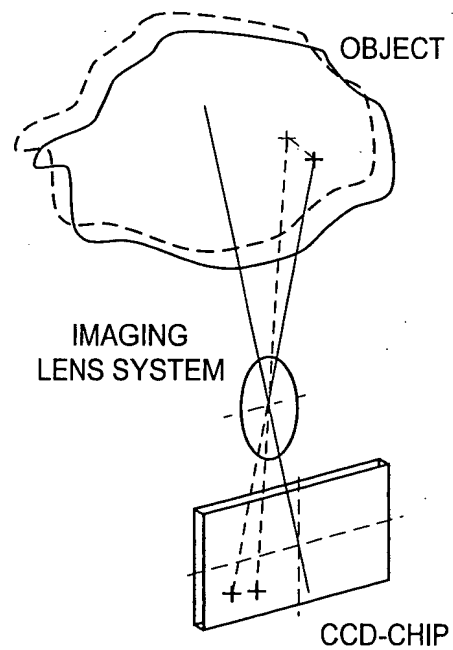
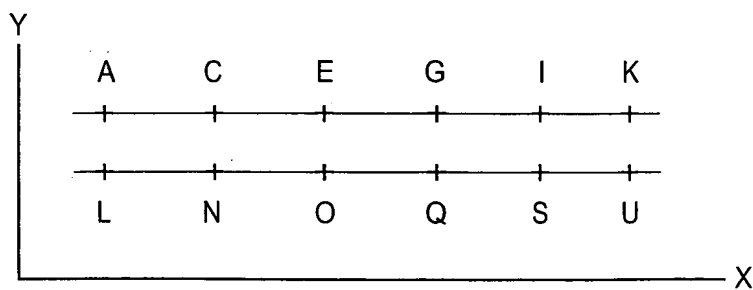
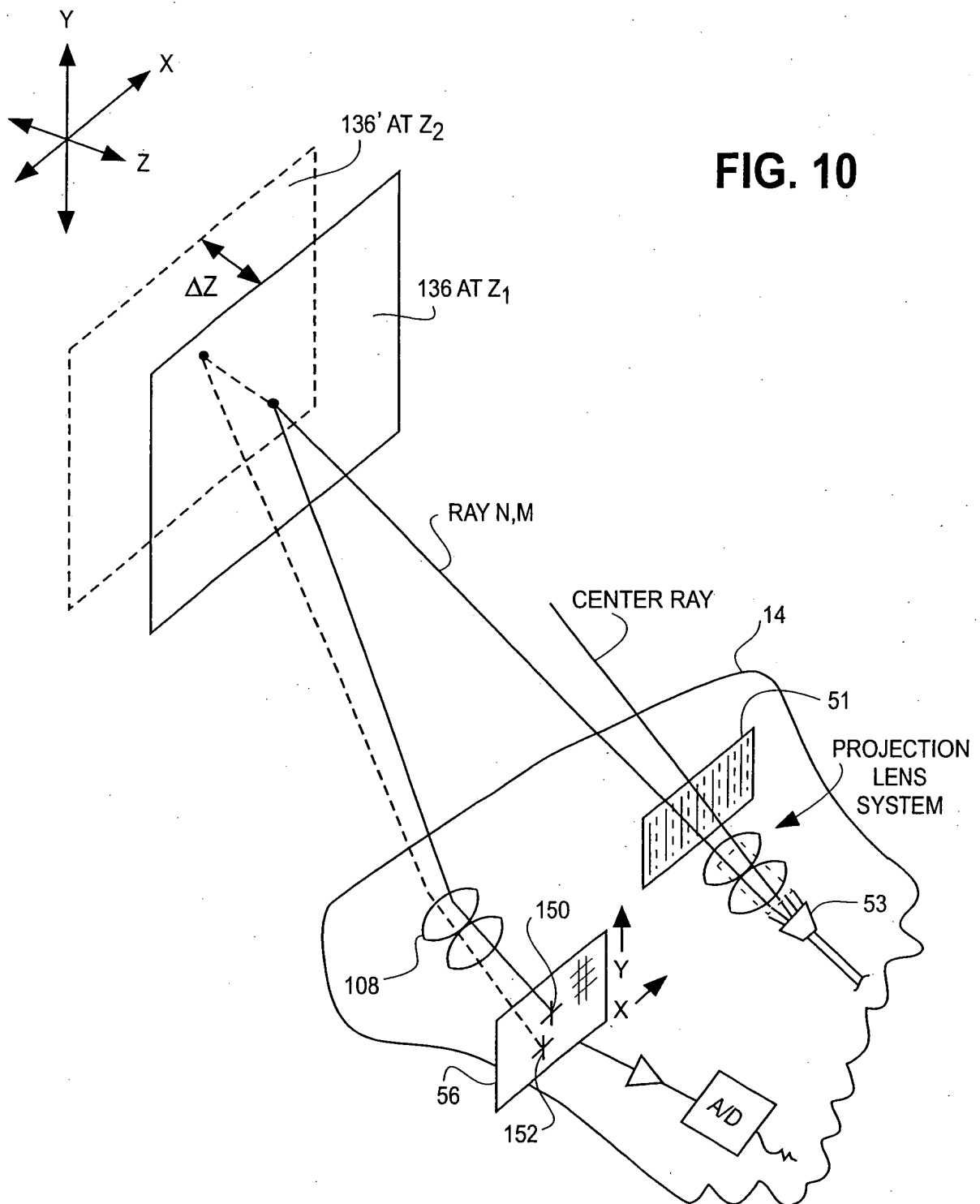


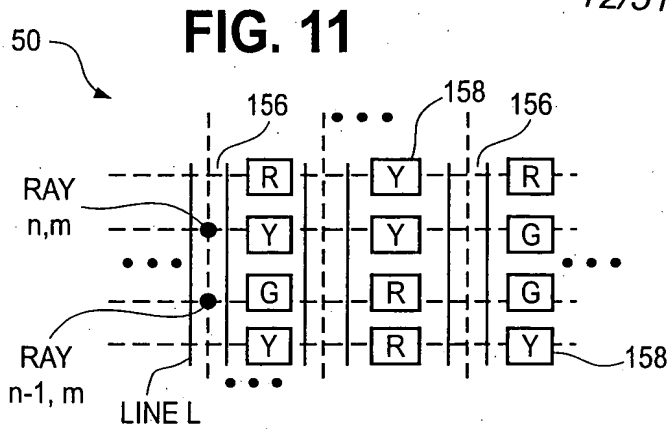
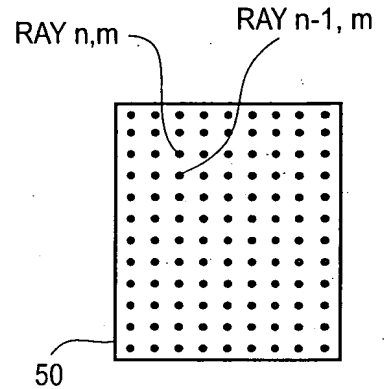
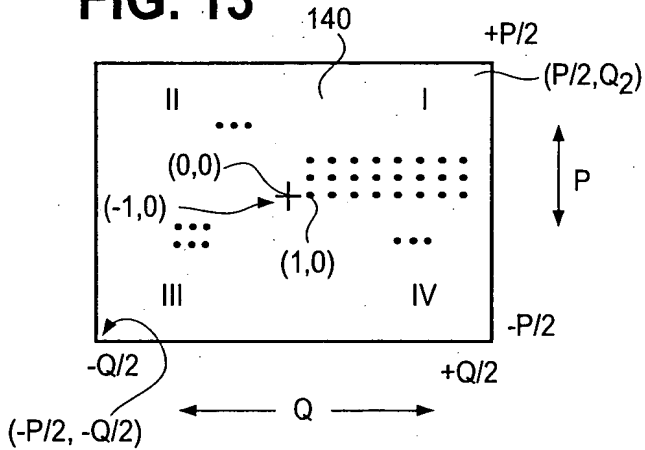
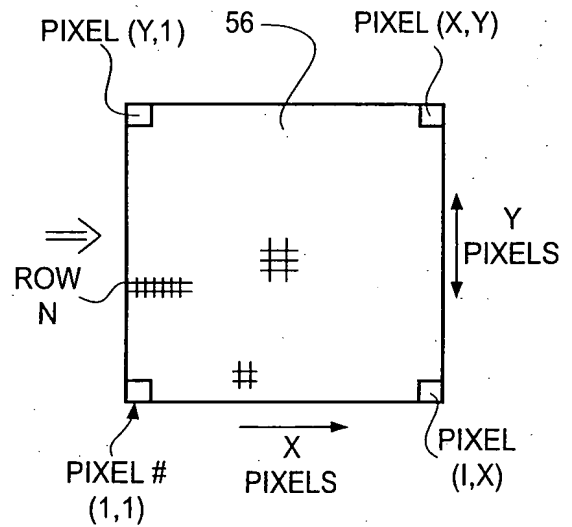
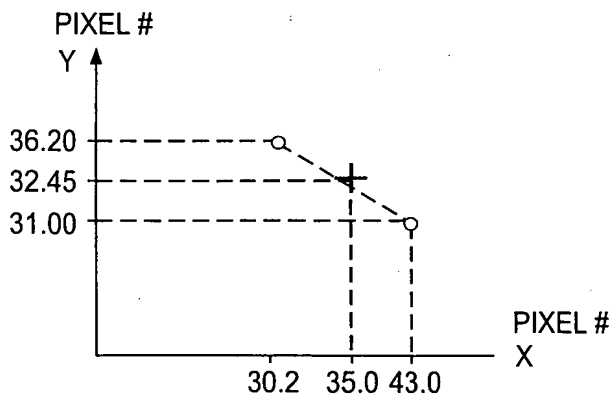
FIG. 9C



PIXEL COORDINATES FOR PORTIONS OF THE PATTERN ASSIGNED TO A CERTAIN Z-LEVEL

FIG. 10



**FIG. 12****FIG. 13****FIG. 14****FIG. 15****FIG. 16**

X-Y CALIBRATION GRID POINTS

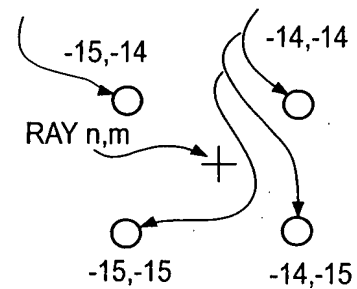


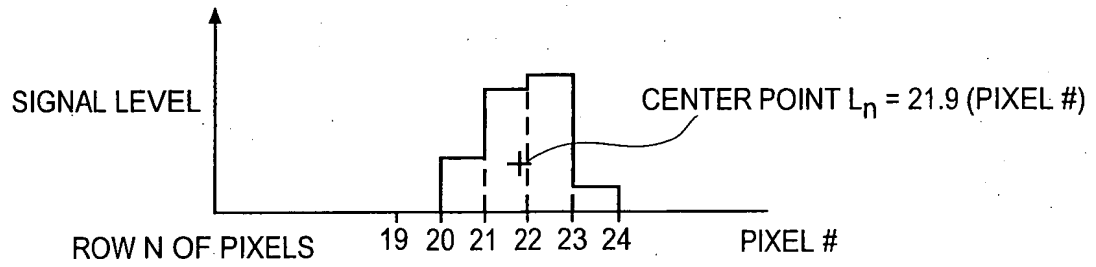
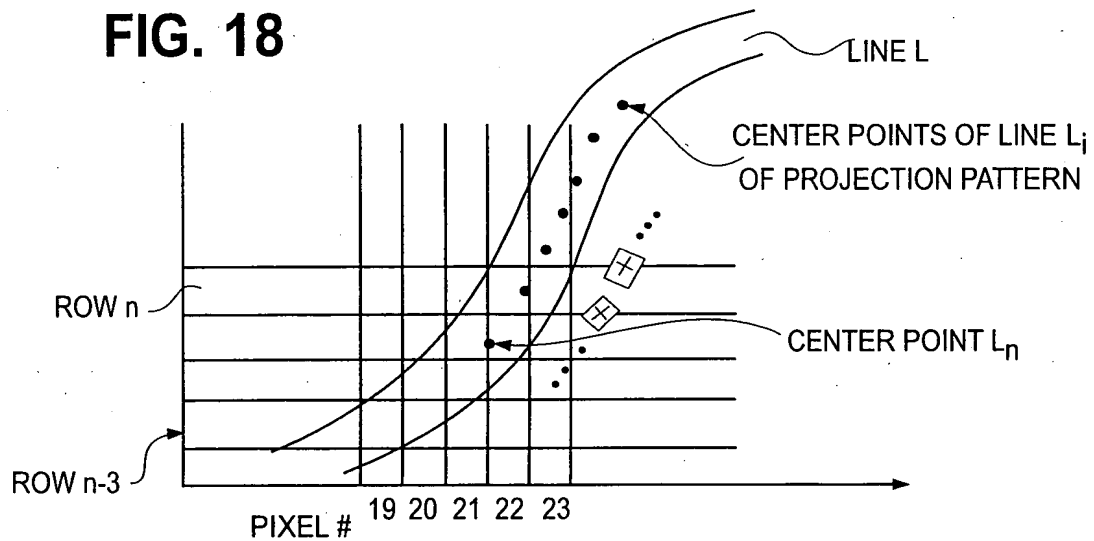
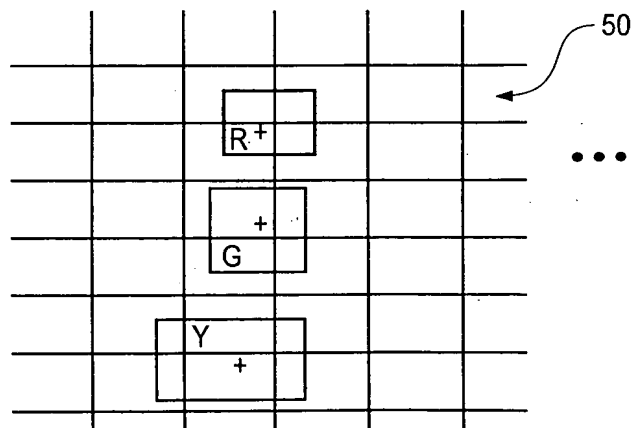
FIG. 17**FIG. 18****FIG. 19**

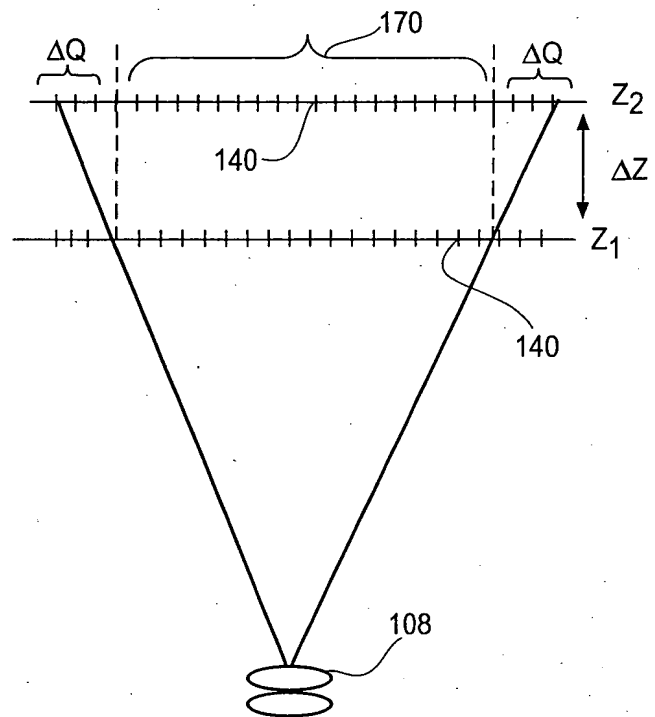
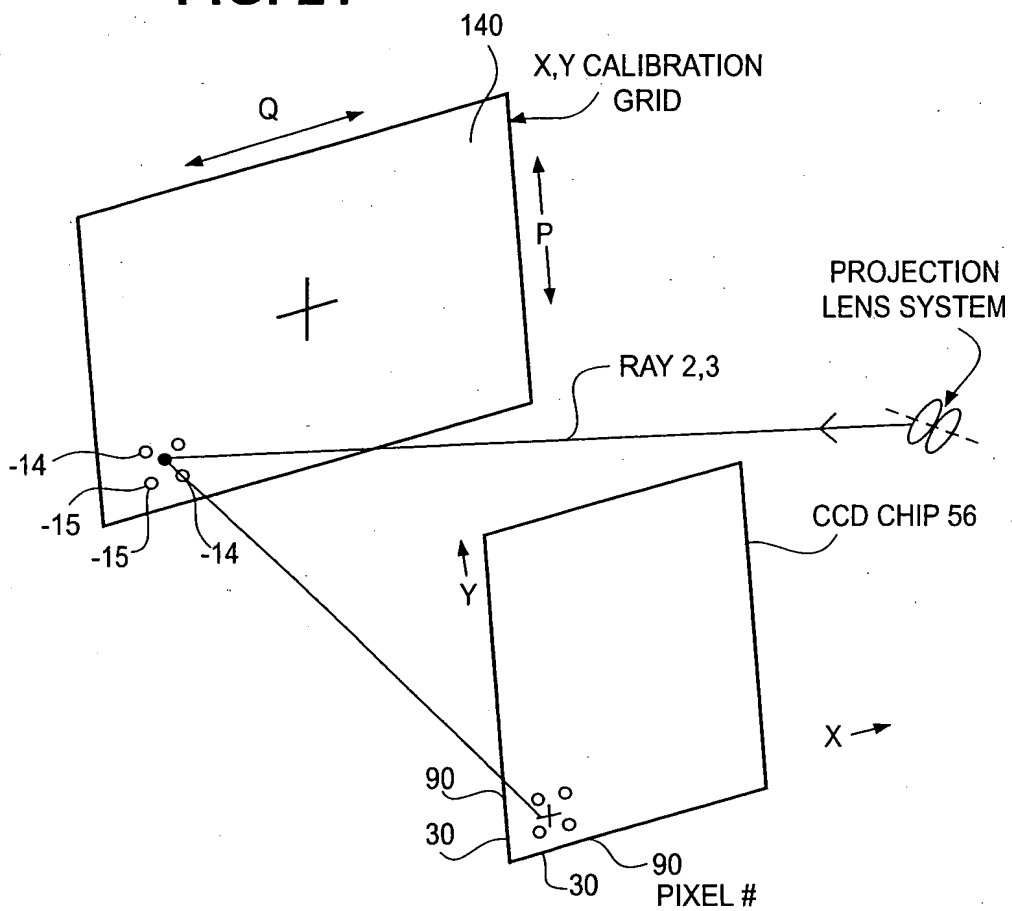
FIG. 20**FIG. 21**

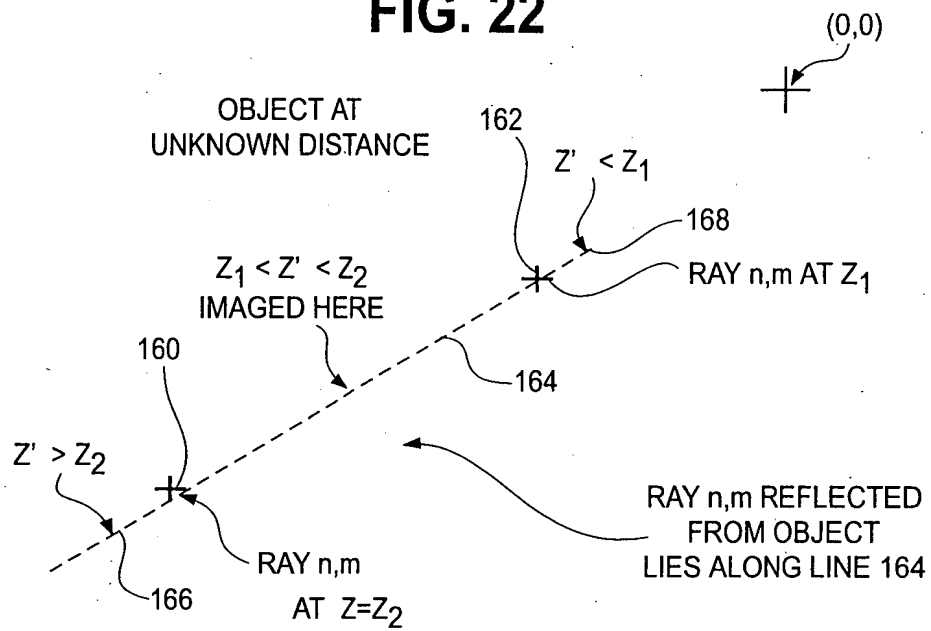
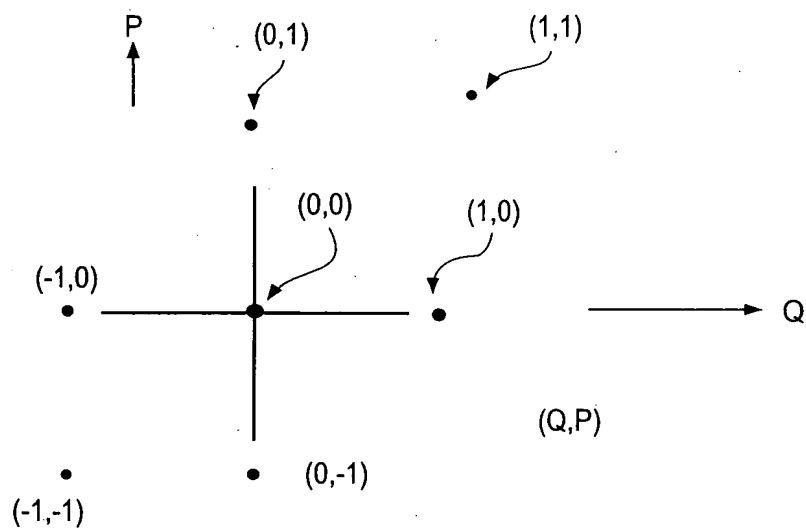
FIG. 22**FIG. 23**

FIG. 24

CCD_X CCD_Y = PIXEL #, IN SUBPIXEL RESOLUTION

(BEFORE)

CALIBRATION TABLE #1

	LINE 1					LINE 2					...					LINE N				
	ROW 1	ROW 2	ROW 3	ROW 4	...	ROW M	ROW 1	ROW 2	ROW 3	ROW 4	...	ROW M	ROW 1	ROW 2	...	ROW M	ROW 1	ROW 2	...	ROW M
CCD _X	1.0	1.1	1.5	2.1		...	27.1	29.5	30.2	37.1										
MM DIST.																				
Z ₁	CCD _Y	10.2	20.4	32.8	44.5		11.5	21.6	36.2	44										
	MM DIST.																			
Z ₂	CCD _X	3.9	4.5	6.8	12.2		34.0	41.1	43.0	46										
	MM DIST.																			
	CCD _Y	12.1	21.5	30.4	46.3		13.2	21.8	31.0	48.2										
	MM DIST.																			

FIG. 25

CALIBRATION TABLE #2

(Q,P)

QUADRANT I

ROW 0

ROW 1

ROW + P/2

	(0,0)	(1,0)	(2,0)	(3,0)	...	(Q/2 - ΔQ,0)	...	(Q/210)	(0,1)	(1,1)	(2,1)	...	(0, P/2)	...	(Q/2, P/2)
Z ₁ CCDX	640.1	700.2	760.6	820.5	...	...	...	—	640.1	700.2	...	...	...	...	1,279.5
CCDY	640.1	640.1	640.3	640.4	...	...	...	—	701.2	701.5	...	...	...	...	1,279.4
Z ₂ CCDX	640.2	680.3	741.2	801.6	...	...	...	1,279.5	...	681.2	...	...	...	...	1,256.4
CCDY	640.2	640.3	640.1	640.1	...	...	...	640.2	...	680.9	...	...	...	...	1,251.5

QUADRANT II

ROW

ROW 1

ROW + P/2

	(-1,0)	(-2,0)	(-3,0)	(-4,0)	...	(-Q/2 - ΔQ,0)	...	(-Q/210)	(-1,1)	(-2,1)	(-3,1)	...	(-1, P/2)	...	(-Q/2, P/2)
Z ₁ CCDX															
CCDY															
Z ₂ CCDX															
CCDY															

QUADRANT III

Z₁ CCDX (-1,-1) (-2,-1) ...
CCDY

Z₂ CCDX
CCDY

QUADRANT IV

Z₁ CCDX (0,-1) (1,-1) ...
CCDY
Z₂ CCDX
CCDY

FIG. 26

CCD_X, CCD_Y = PIXEL #, IN SUBPIXEL RESOLUTION

CALIBRATION TABLE #1 (AFTER)

	PATTERN				PATTERN				LINE 2				LINE N			
	ROW 1	ROW 2	ROW 3	ROW 4	•••	ROW M	ROW 1	ROW 2	ROW 3	ROW 4	•••	ROW M	ROW 1	ROW 2	•••	ROW M
CCD _X	1.0	1.1	1.5	2.1		•••	27.1	29.5	30.2	37.1						
MM DIST.									-14.6							
CCD _Y	10.2	20.4	32.8	44.5			11.5	21.6	36.2	44						
MM DIST.									-14.4							
CCD _X	3.9	4.5	6.8	12.2			34.0	41.1	43.0	46						
MM DIST.									-14.8							
CCD _Y	12.1	21.5	30.4	46.3			13.2	21.8	31.0	48.2						
MM DIST.									-15.8							

Z₁

Z₂

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Fig. 27

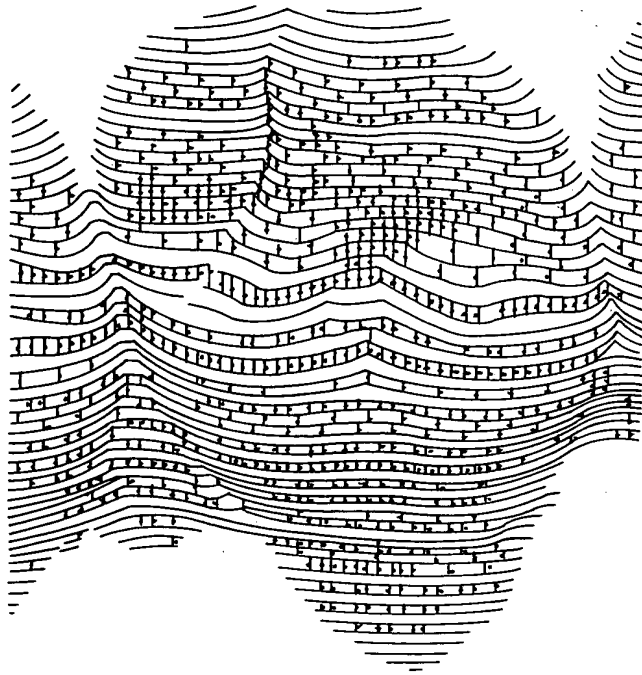


Fig. 28

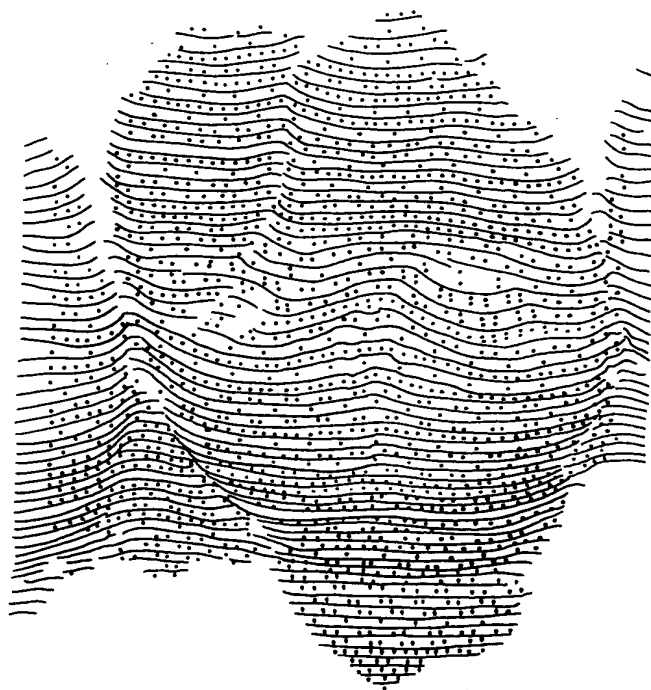


Fig. 29



Fig. 30

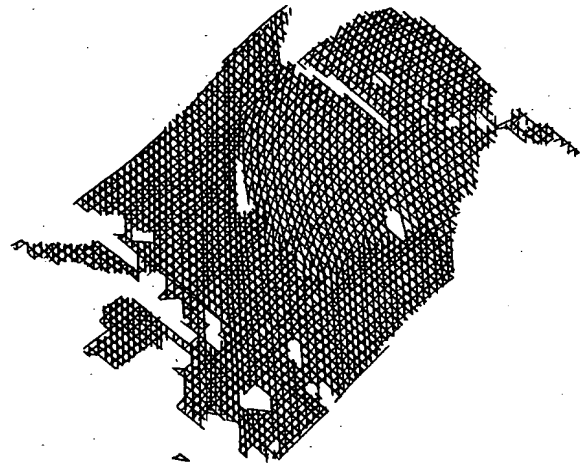


Fig. 31



Fig. 32



Fig. 33

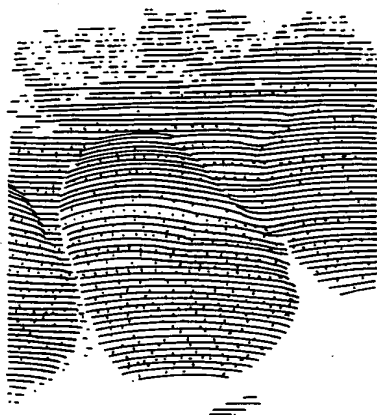


Fig. 34

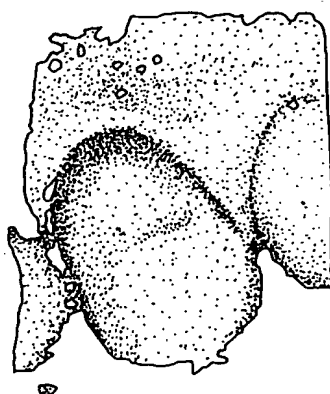


Fig. 35

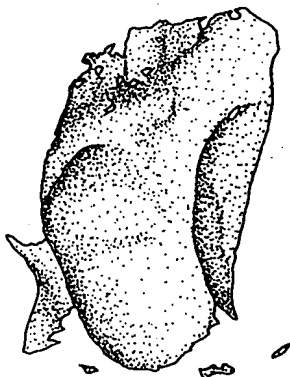
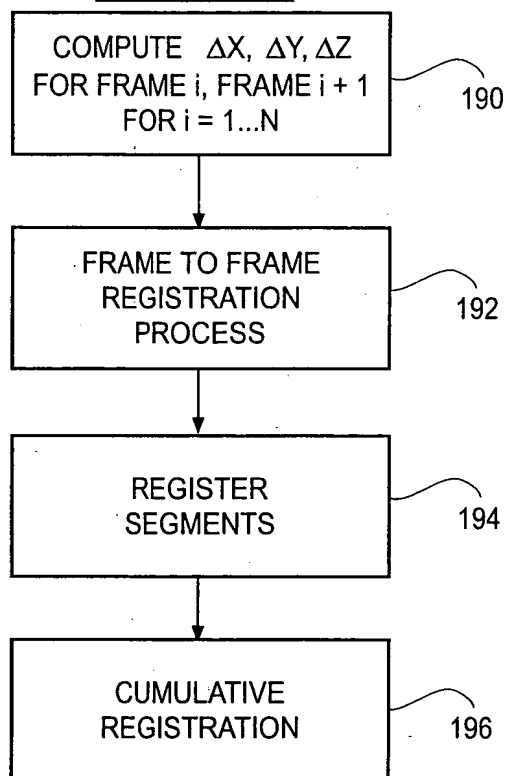


FIG. 36REGISTRATION

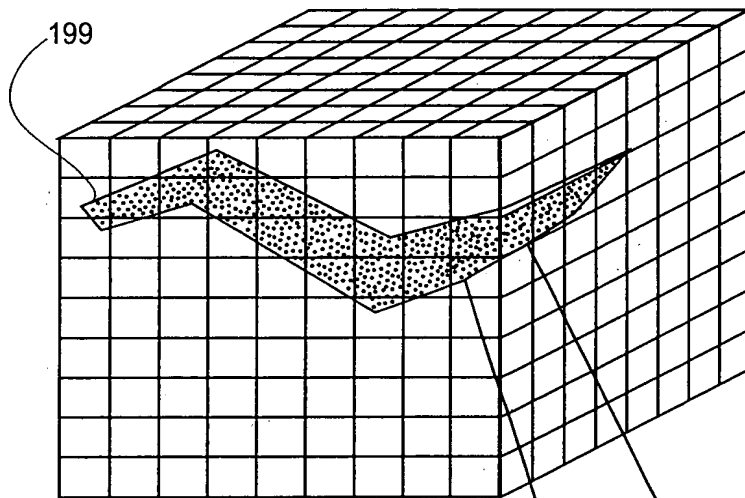
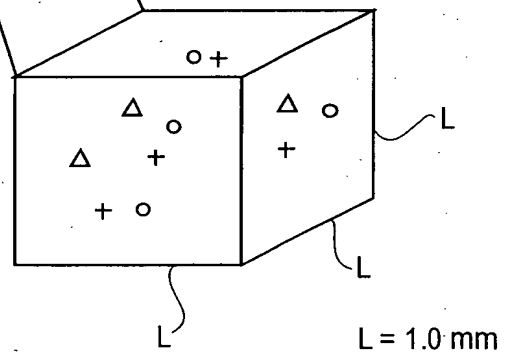


FIG. 37A

FIG. 37B



Δ = POINTS OF FRAME i
 $+$ = POINTS OF FRAME $i+1$
 \circ = POINTS OF FRAME $i+2$

FIG. 37C

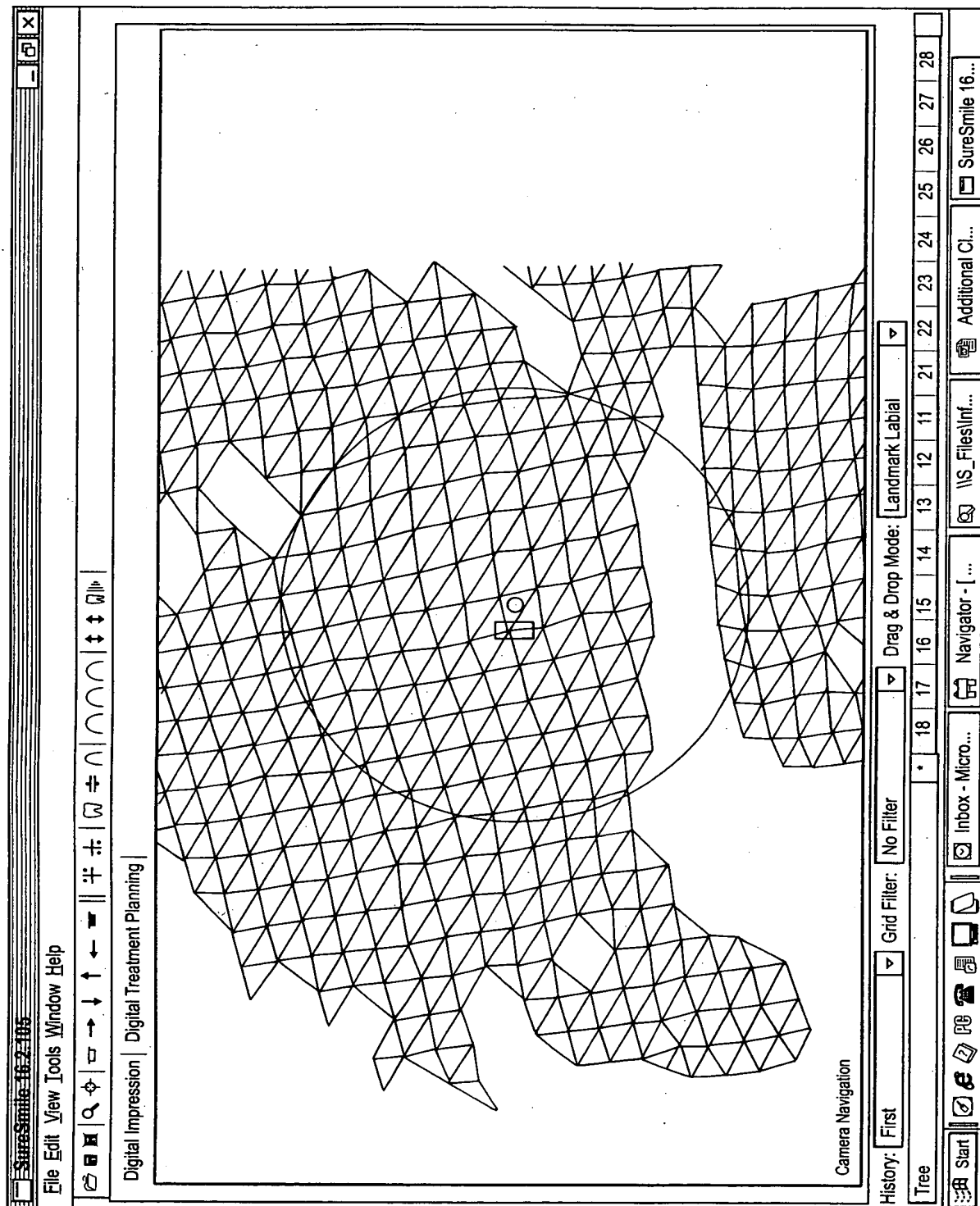
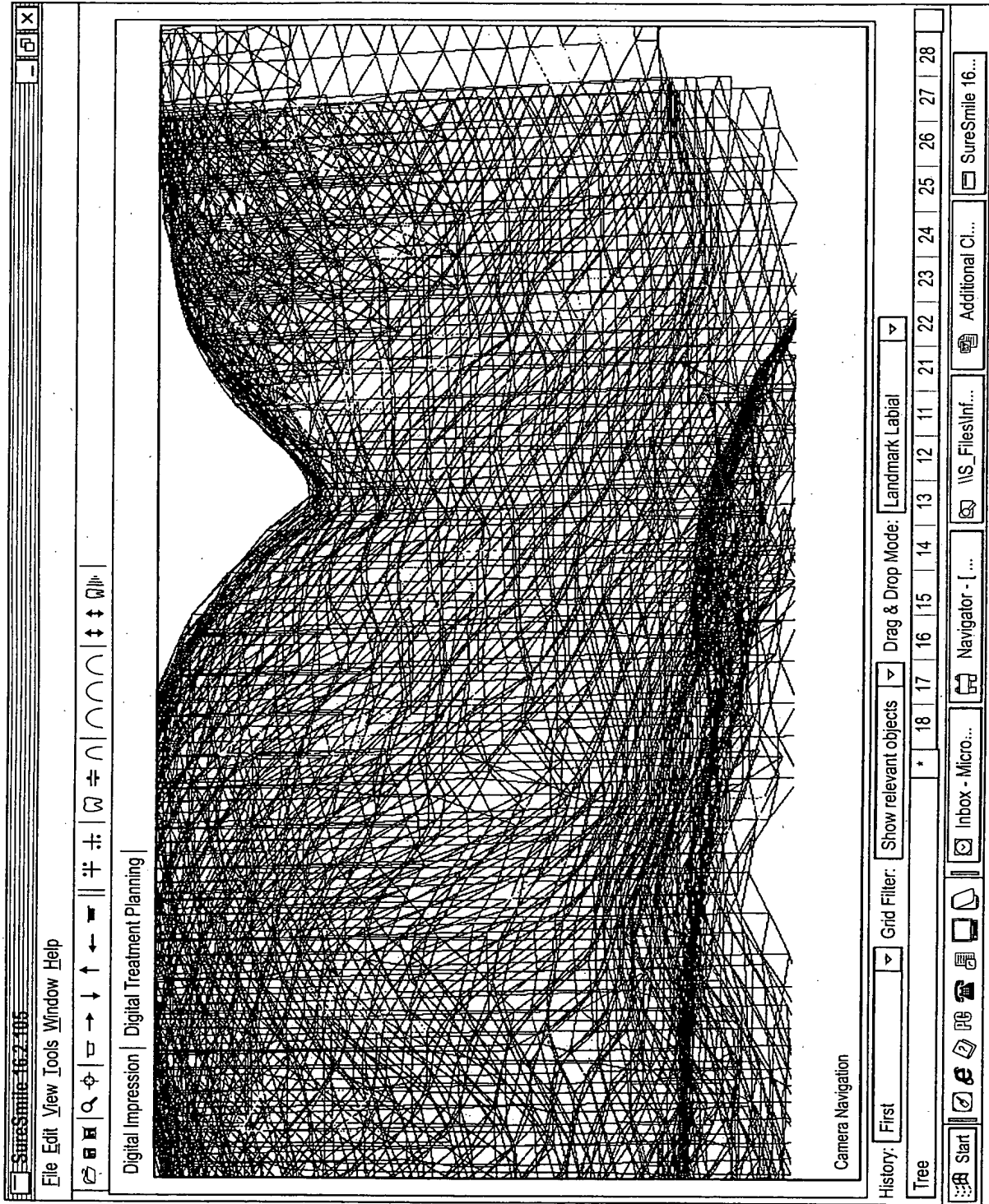
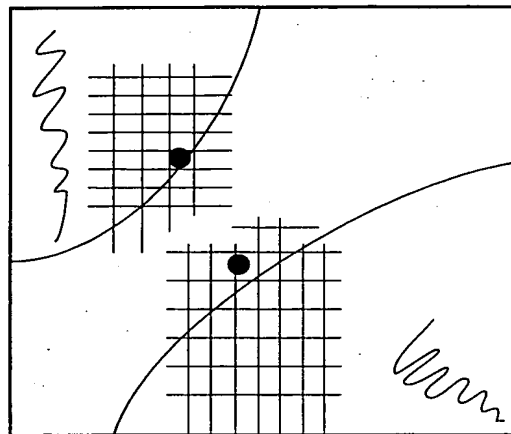


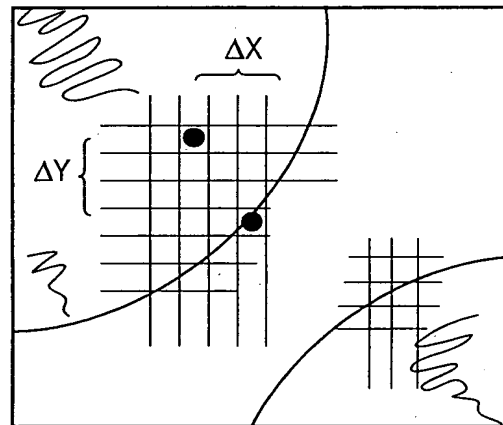
FIG. 37D





FRAME i

FIG. 38A



FRAME i + 1

FIG. 38B

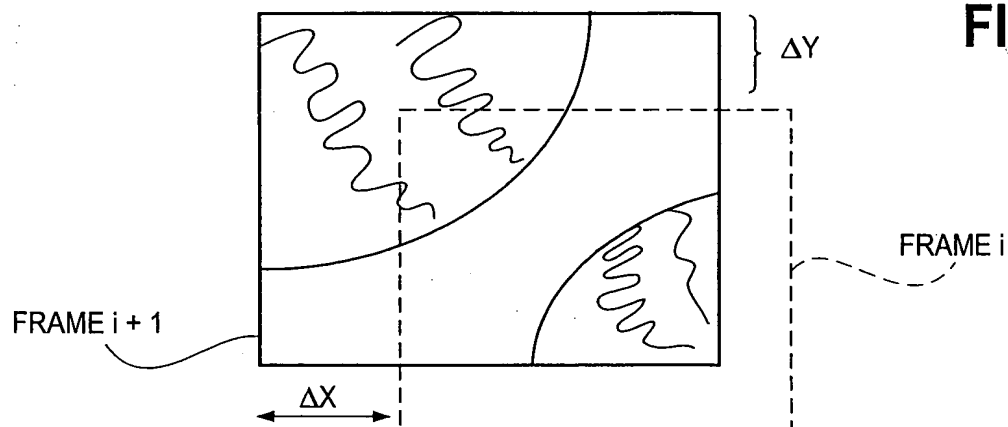


FIG. 38C

FIG. 39A

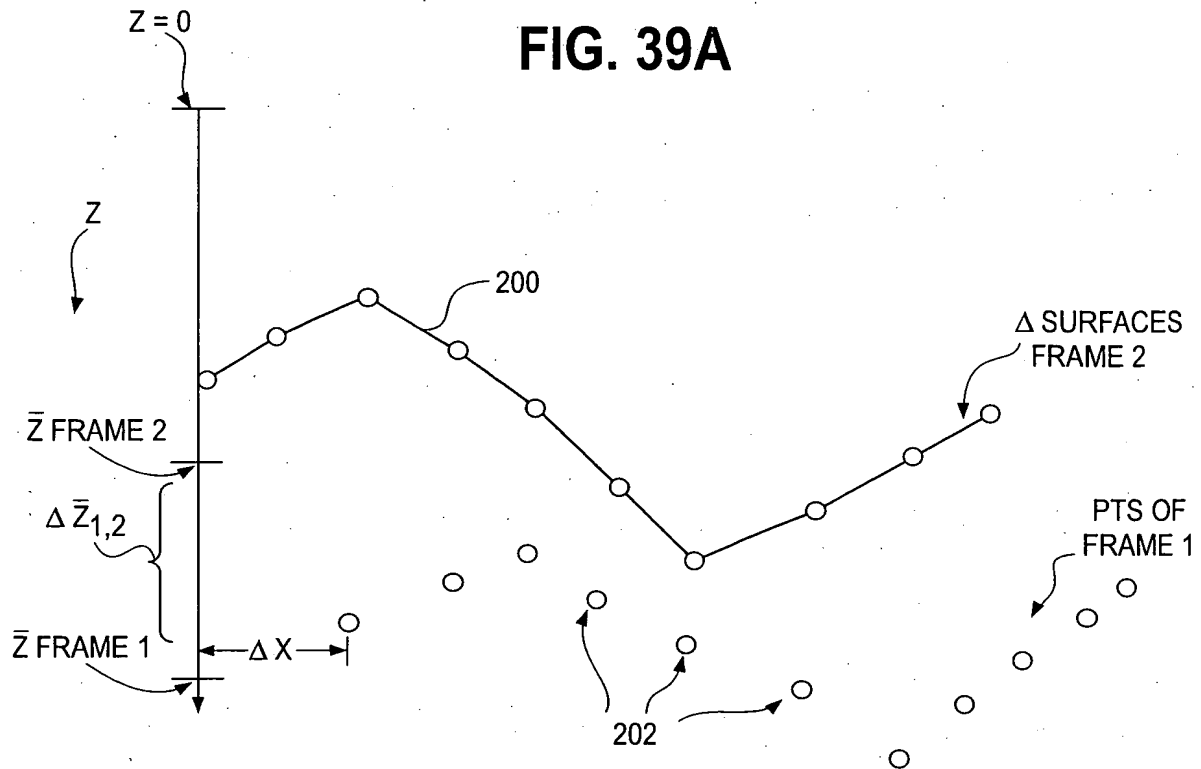


FIG. 39B

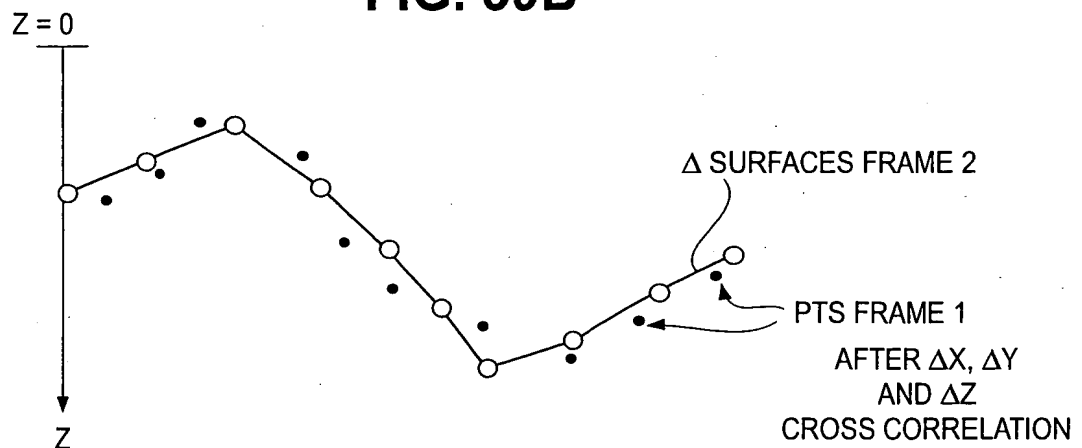


FIG. 40A

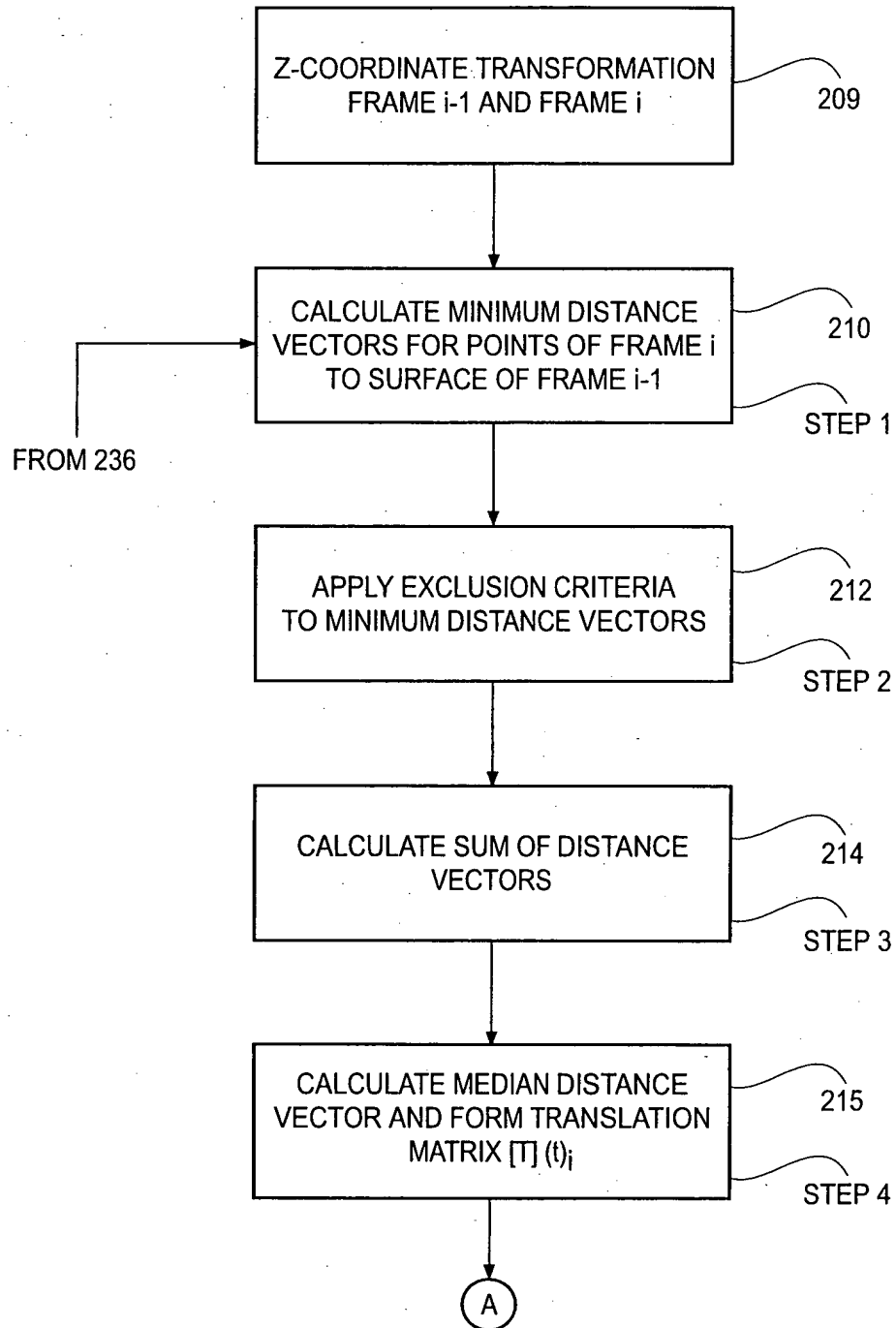


FIG. 40B

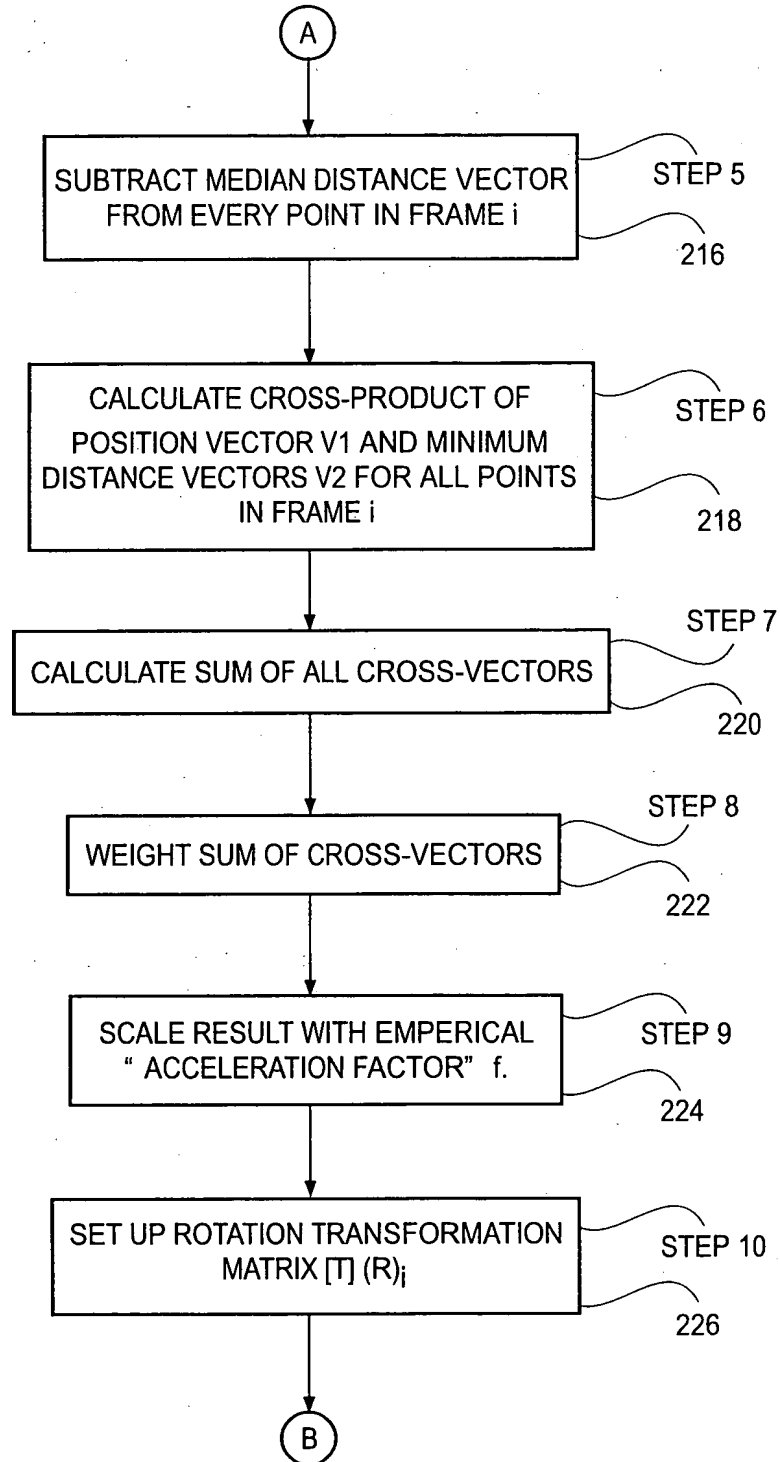


FIG. 40C

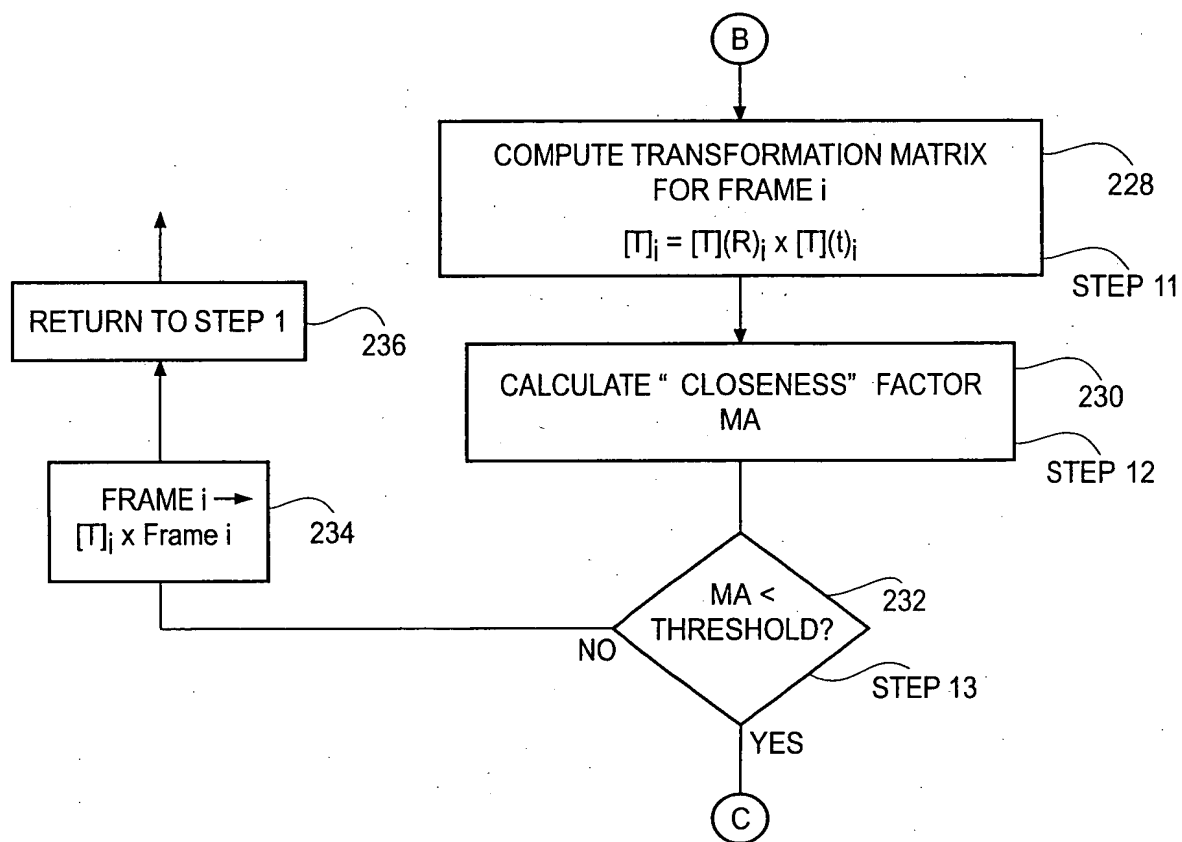


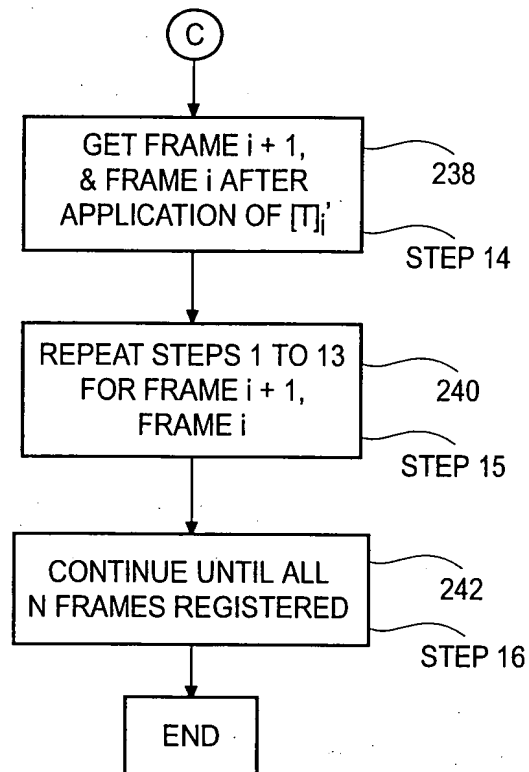
FIG. 40D

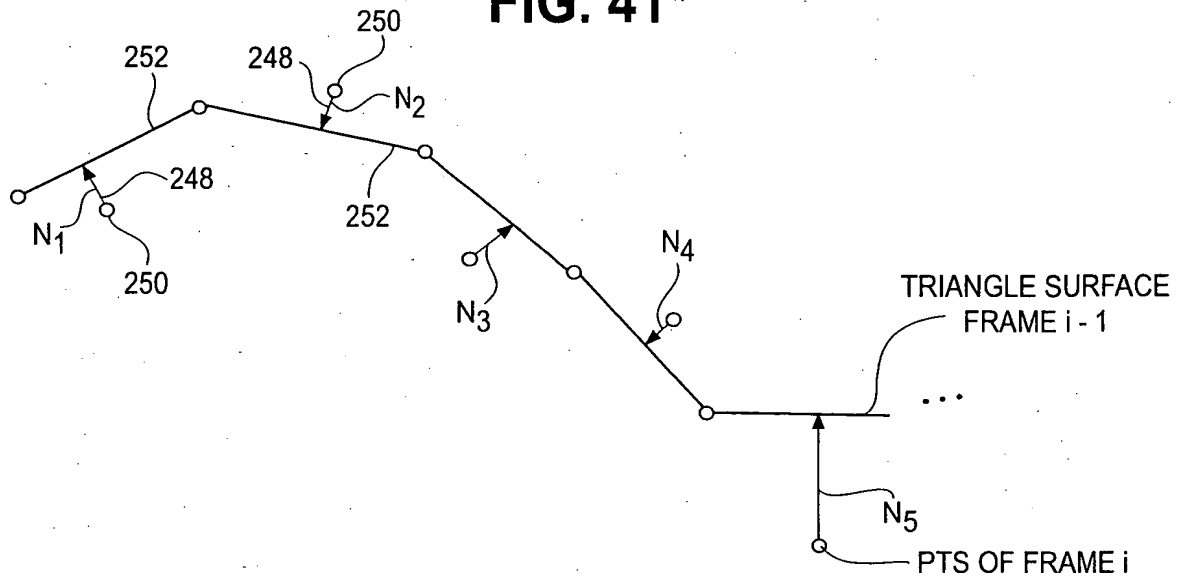
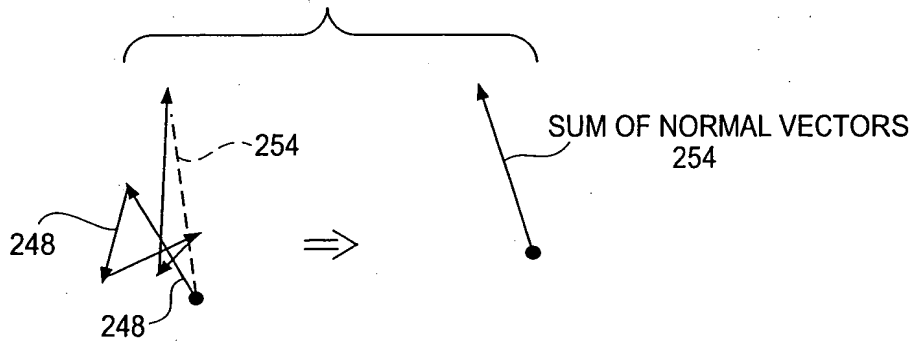
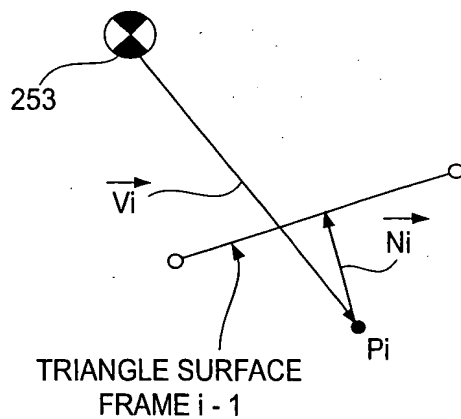
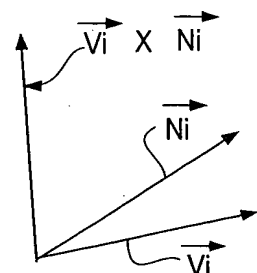
FIG. 41**FIG. 42****FIG. 43****FIG. 44**

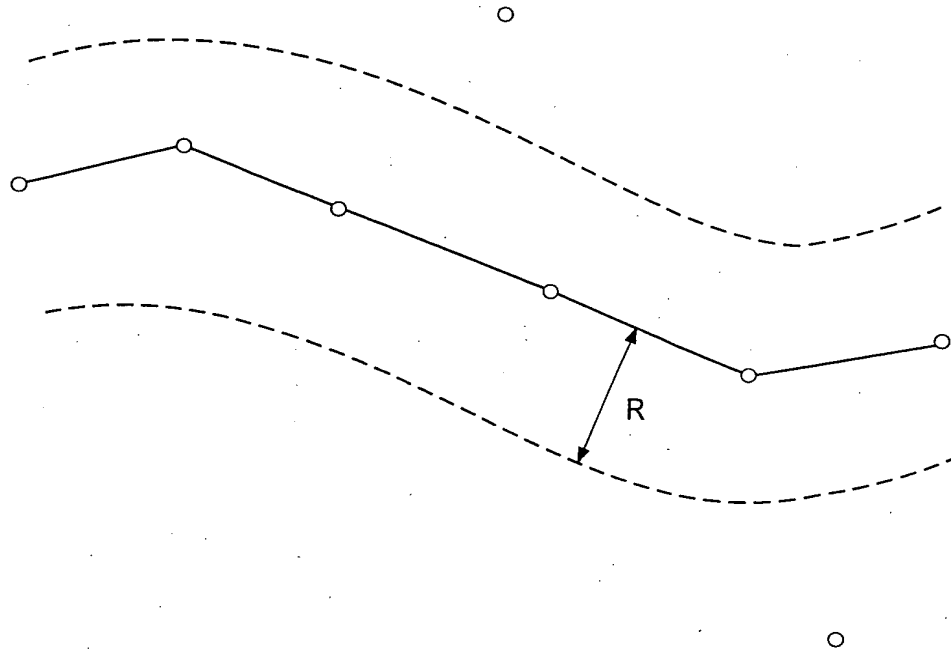
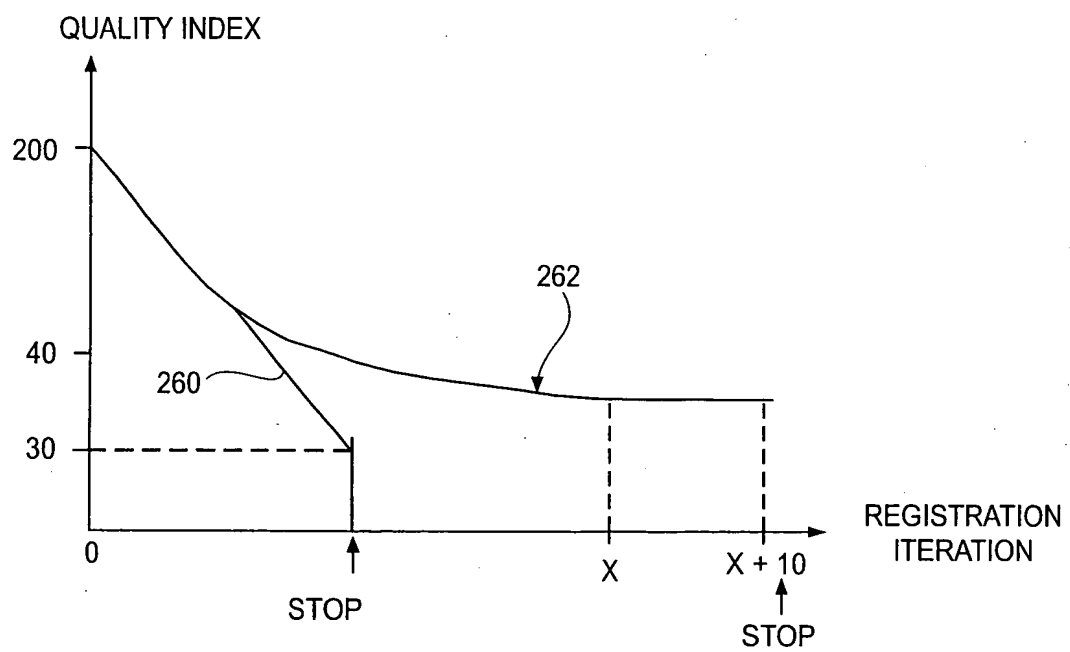
FIG. 45**FIG. 46**

FIG. 47A

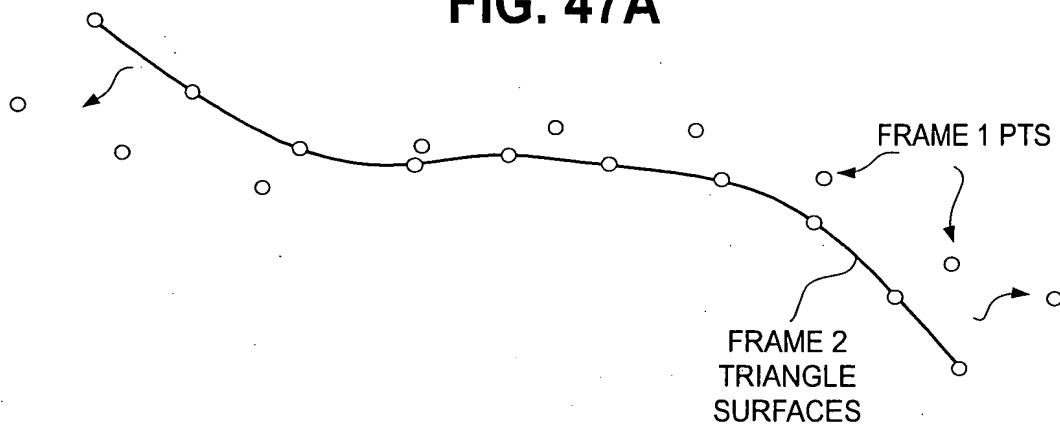


FIG. 47B

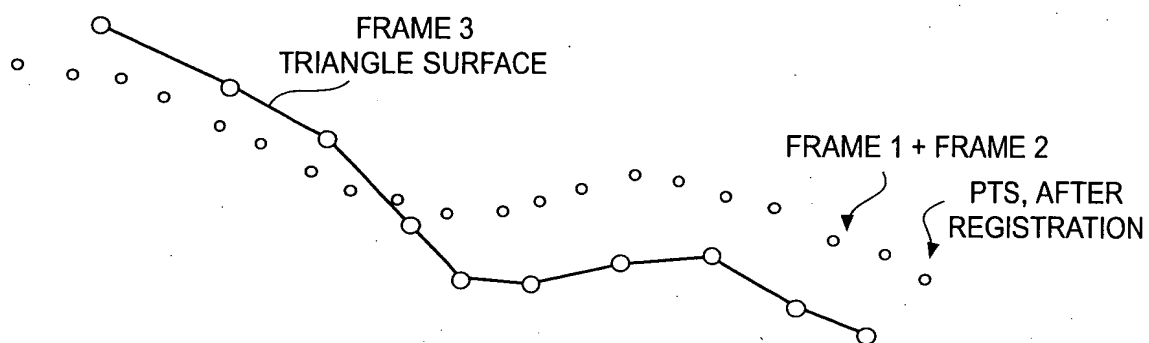


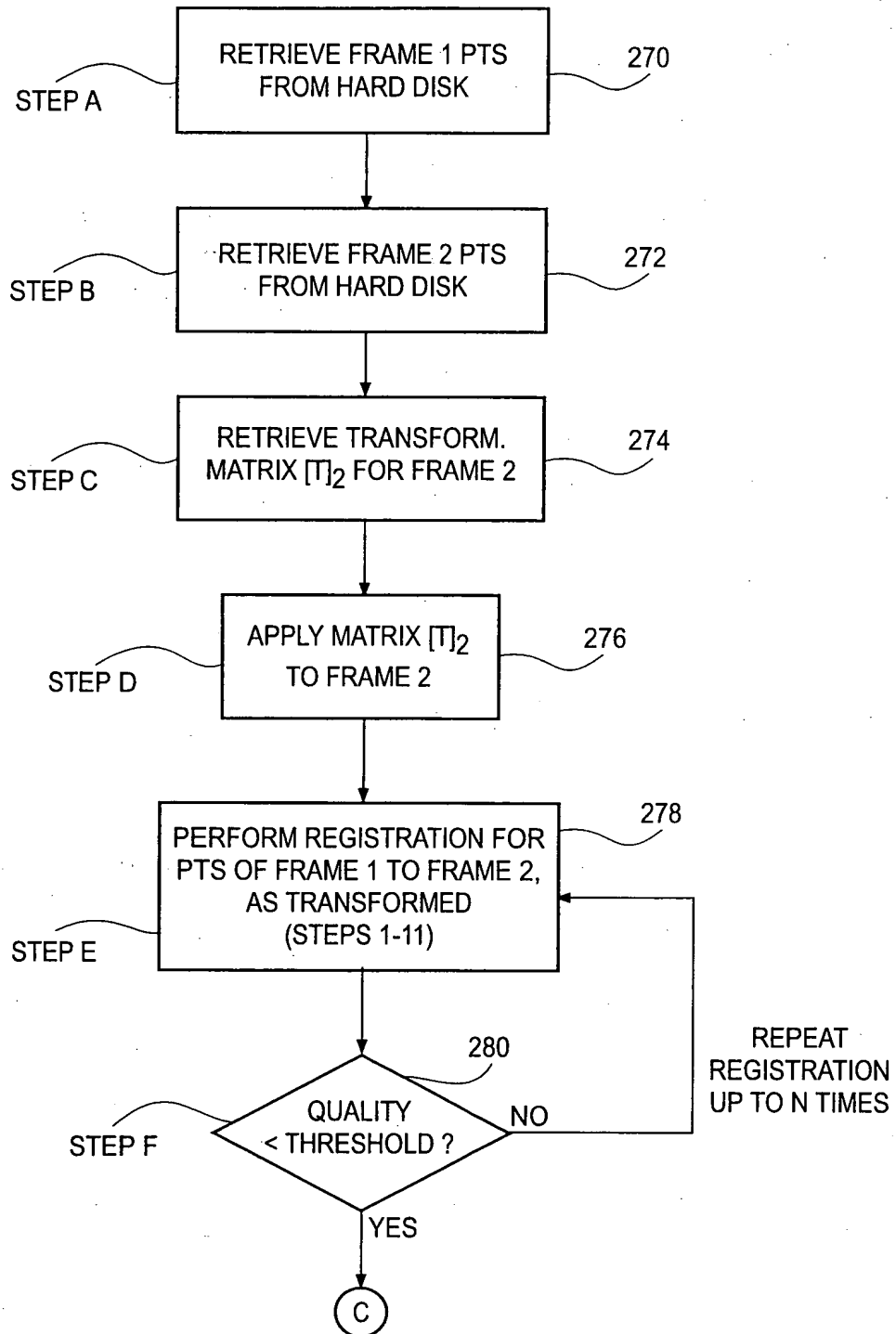
FIG. 48ACUMULATIVE REGISTRATION

FIG. 48B

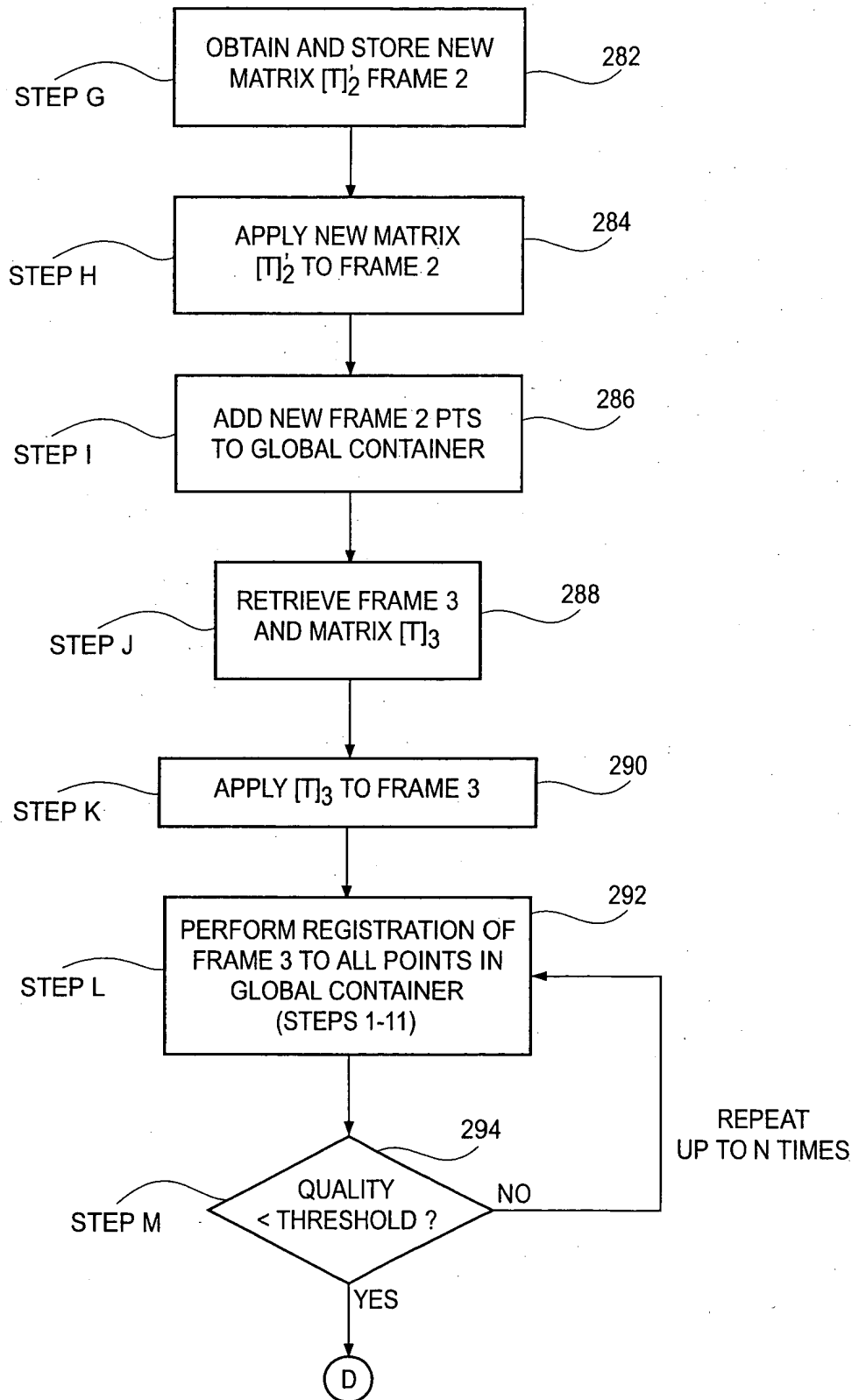


FIG. 48C

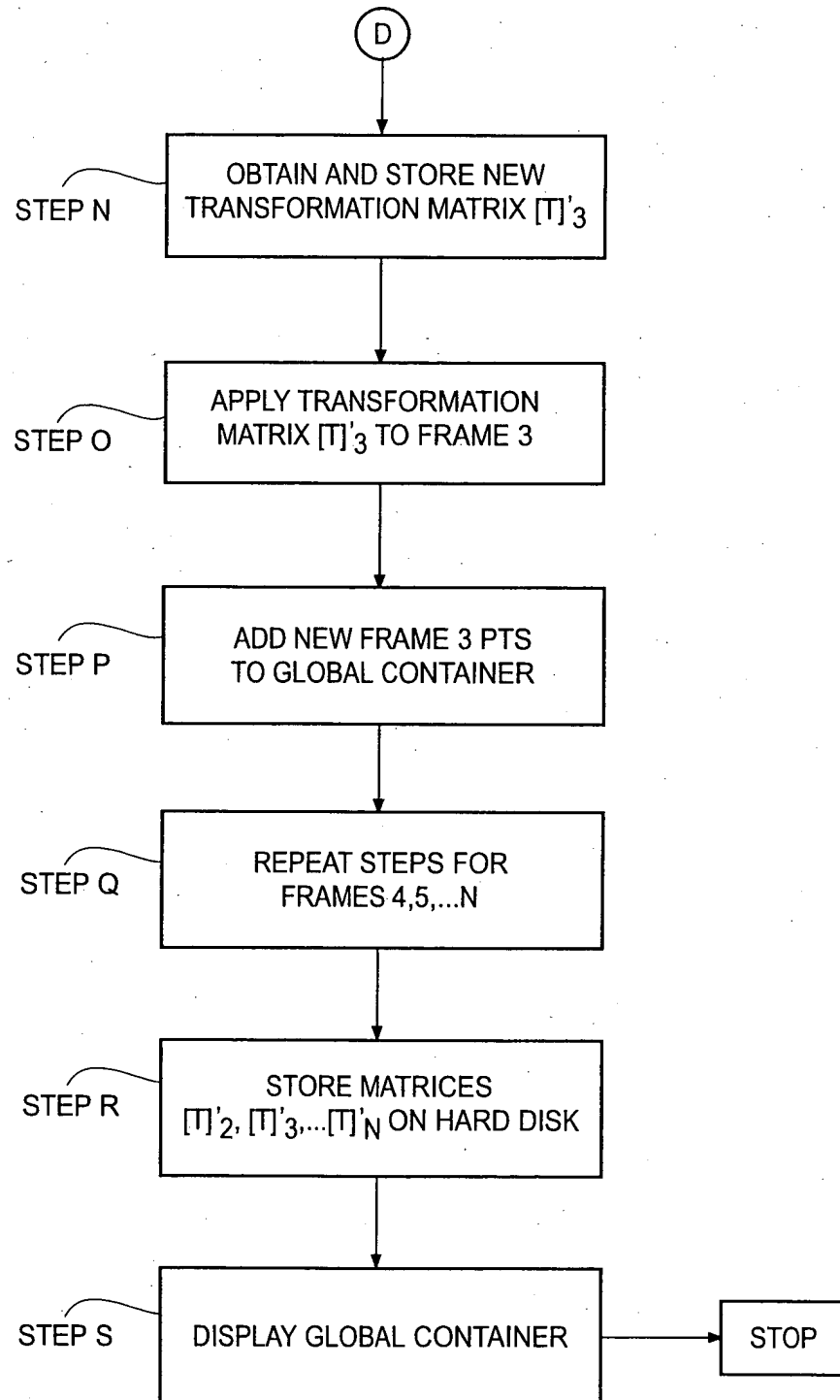


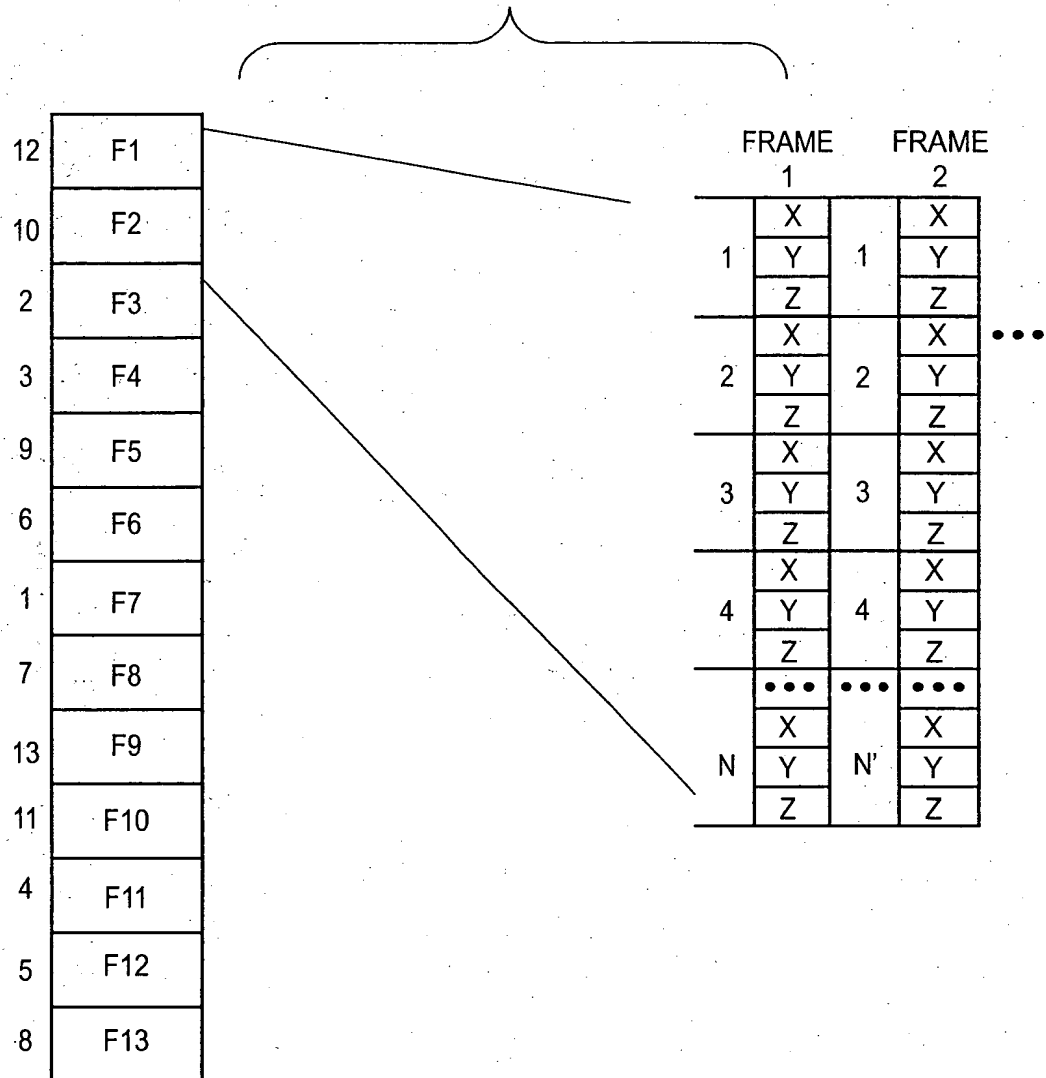
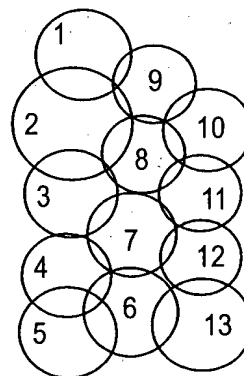
FIG. 49**FIG. 50**

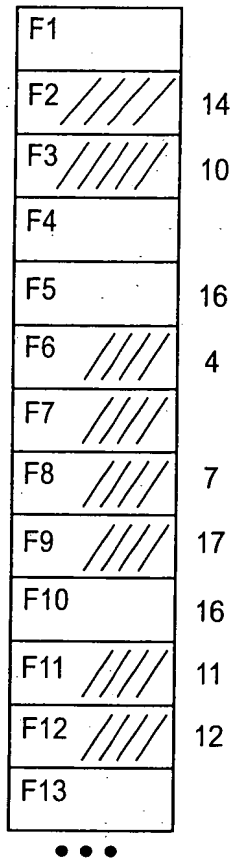
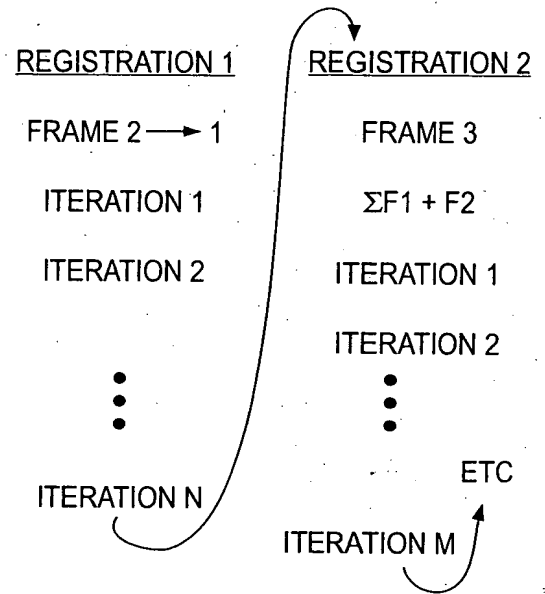
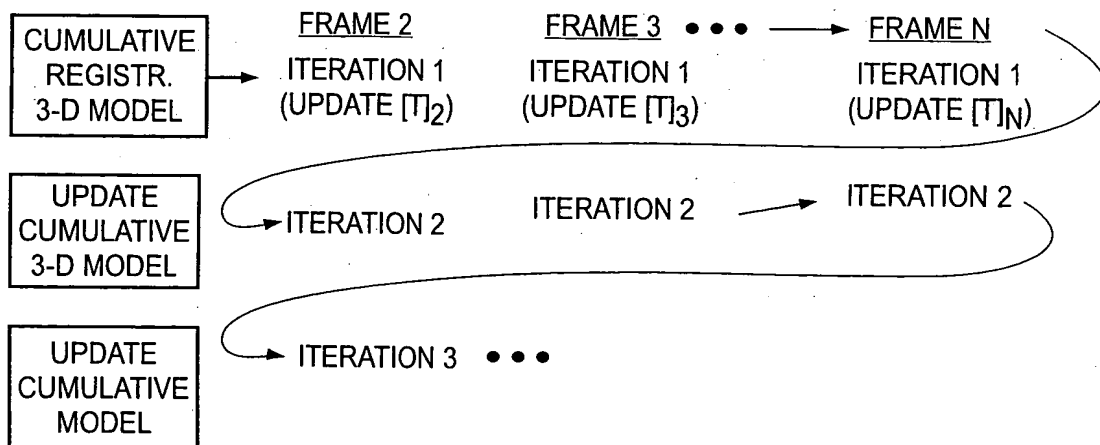
FIG. 51**FIG. 52****FIG. 53**

FIG. 54

☒ Single
☐ Cumulative

X	Y	Z
0.00	0.00	0.00
3.00	0.00	0.00
-3.00	0.00	0.00
0.00	3.00	0.00
0.00	-3.00	0.00

Registration (raw)

Distance limit (SYX)
Stationary count
Radius (SYX)
Convergence factor
Number of points to register
Accelerate factor

Registration (raw + fine)

Maximal iteration count
Overlap size
Minimum quote of active points (0..1)
Maximal triangle size (larger triangles are treated as gaps)
Maximal edge length (longer edges have no attraction)
Maximal count of unsuccessful files new segment is started when exceeded)
Form factor: Proportion of point distance and element size (>=0)

Registration (line)

Distance limit (SYX)
Final distance
Stationary count
Radius (SYX)
Convergence factor
Number of points to register
Accelerate factor

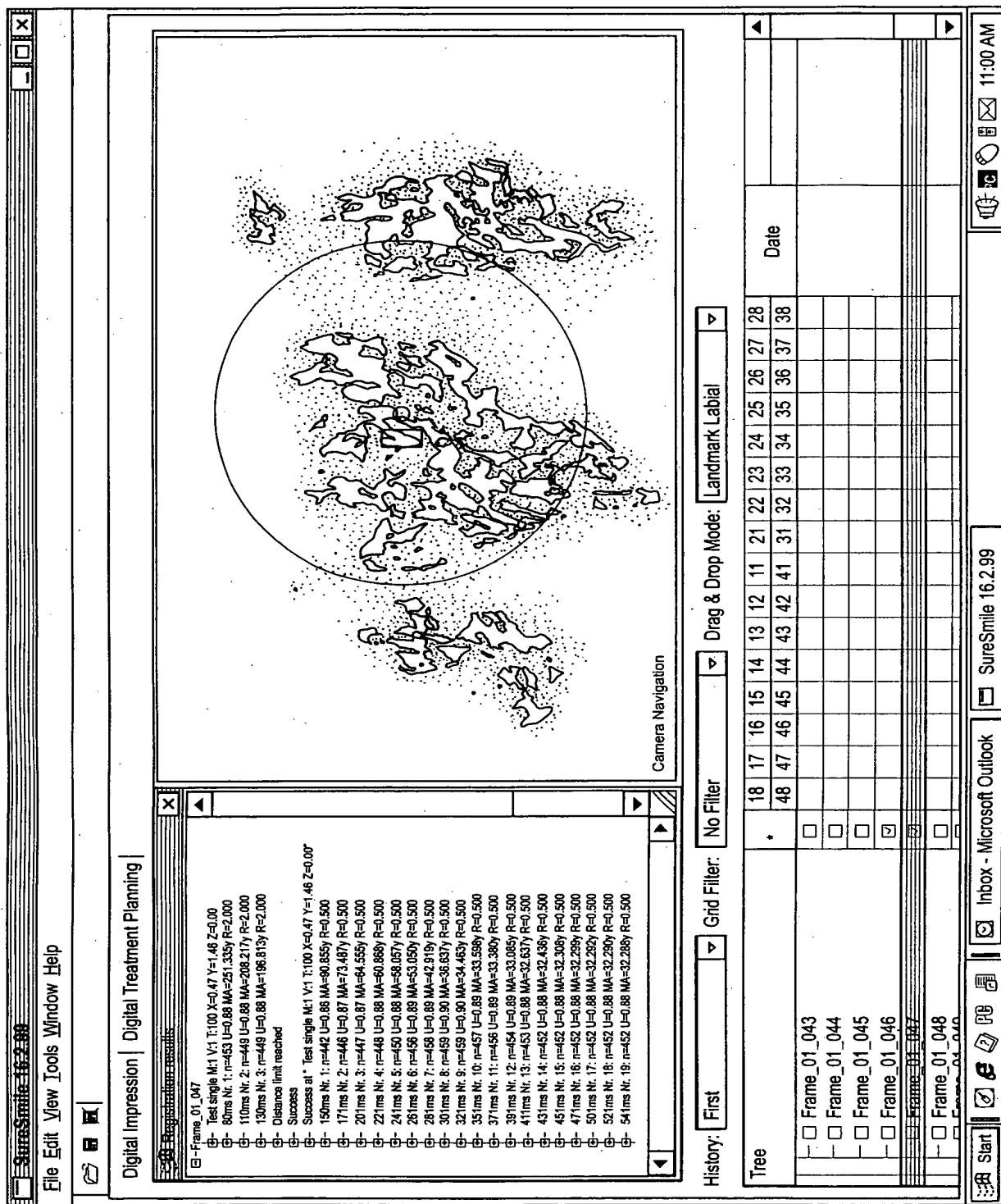
general

Count of SYX surfaces for animation (0= off)
Cell size
☒ Combine frames cumulative
☒ Combine segments cumulative

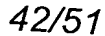
Merging

Radius of sphere inside which is to replace
Minimal triangle plane size for closing gaps
Minimal distance from point of base quantity
Maximal count of edge lines for closing gaps
Maximal edge length for closing gaps
Maximal distance from edge of base quantity

FIG. 55



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302



LANDMARK LABEL ☐

301UPPER JAW
FRONT (SEGMENT)

306

Fig. 58A

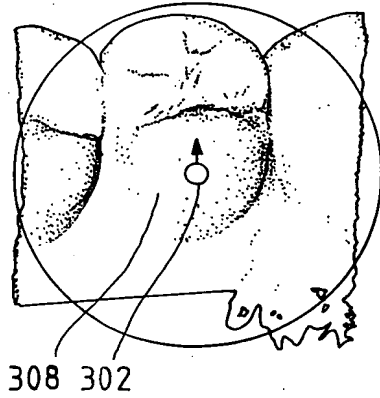


Fig. 58B

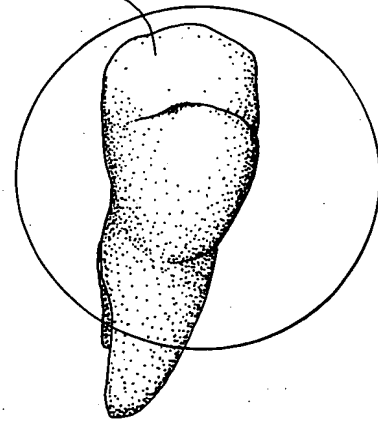


Fig. 58C

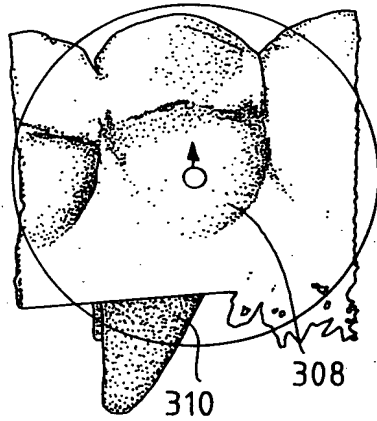


Fig. 58D

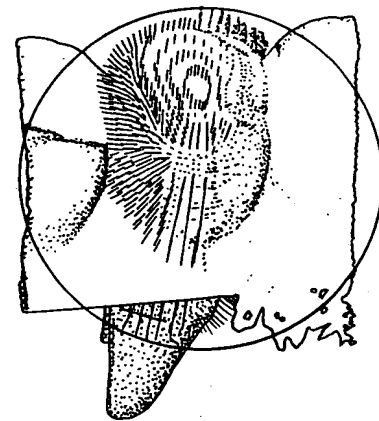


Fig. 58E

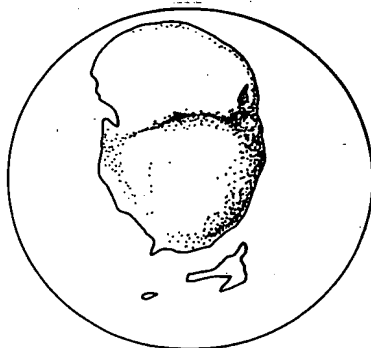


Fig. 58F

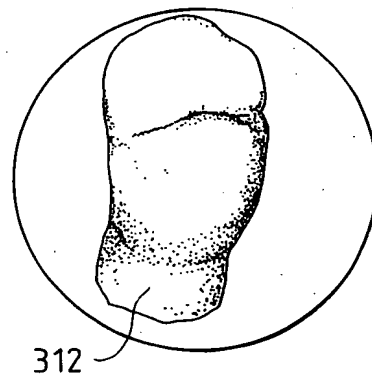


Fig. 59

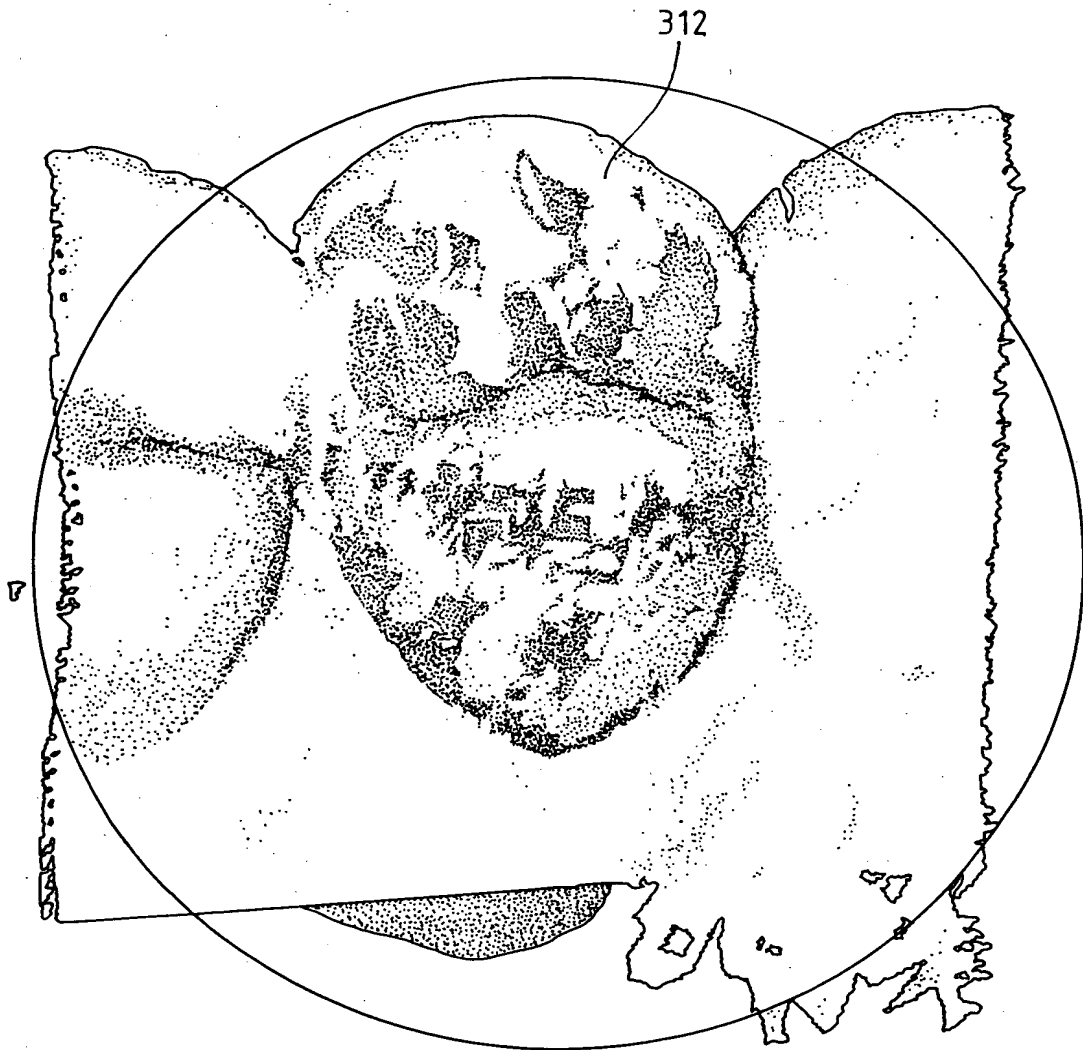


FIG. 60

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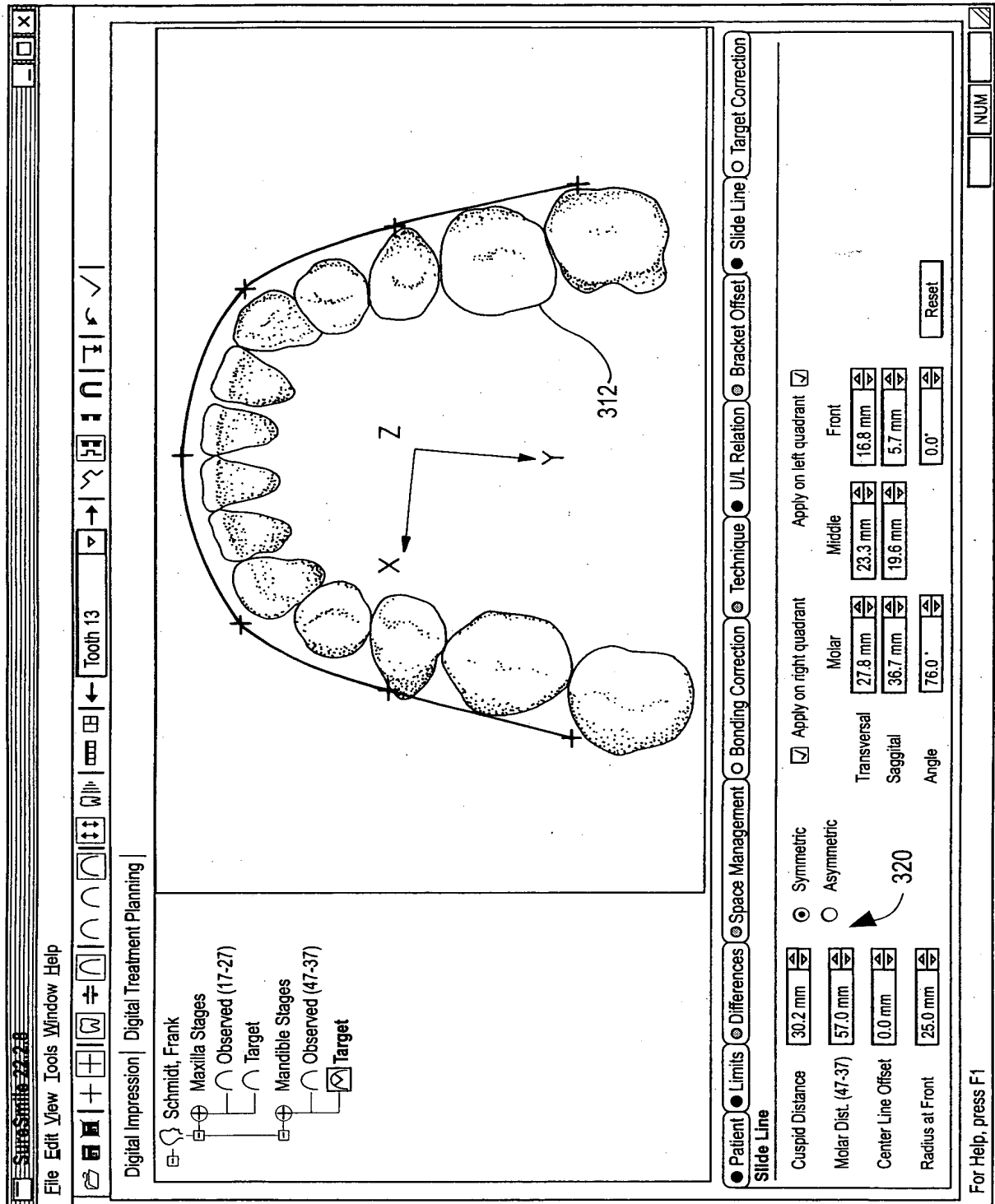


FIG. 61

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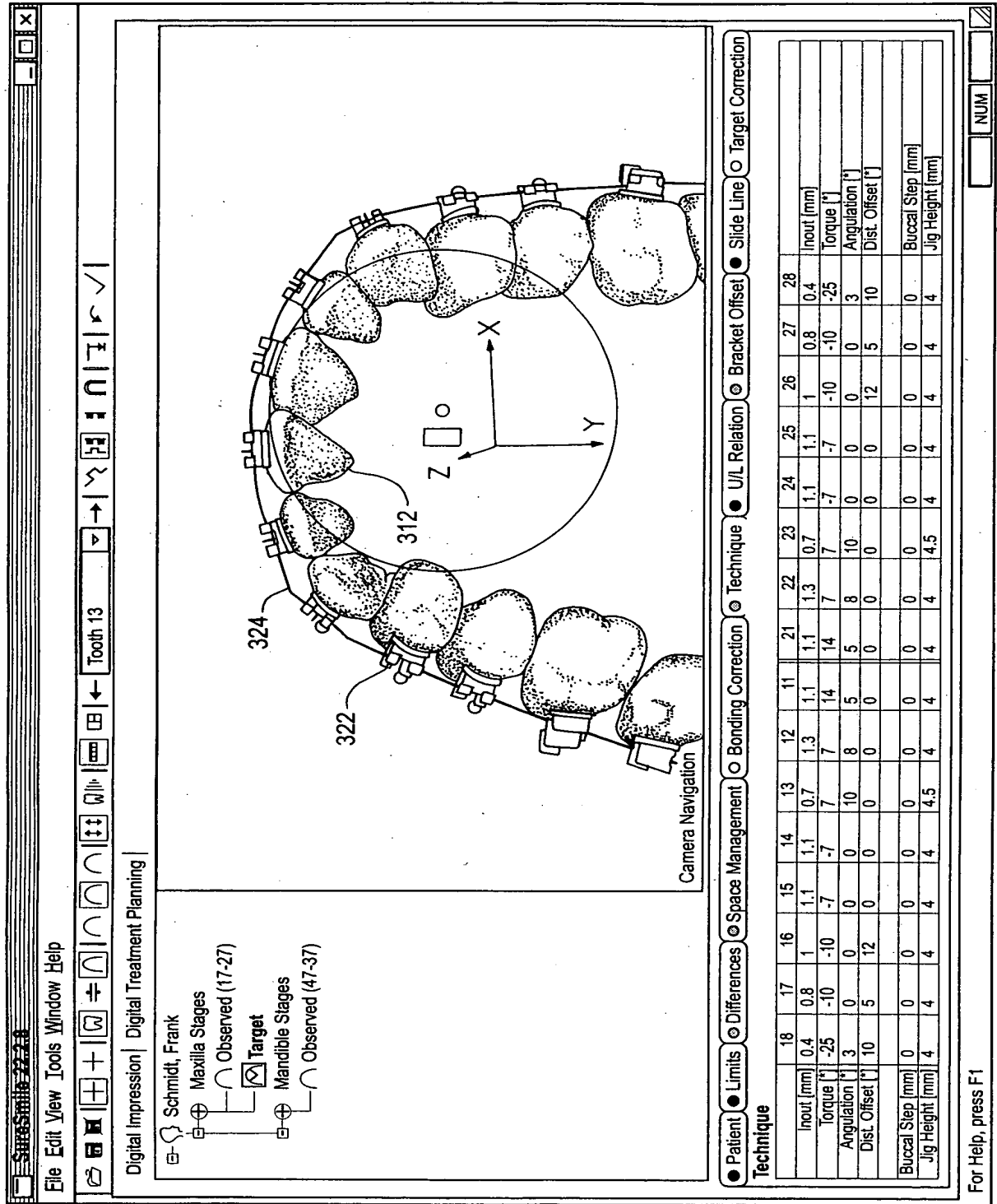


FIG. 63

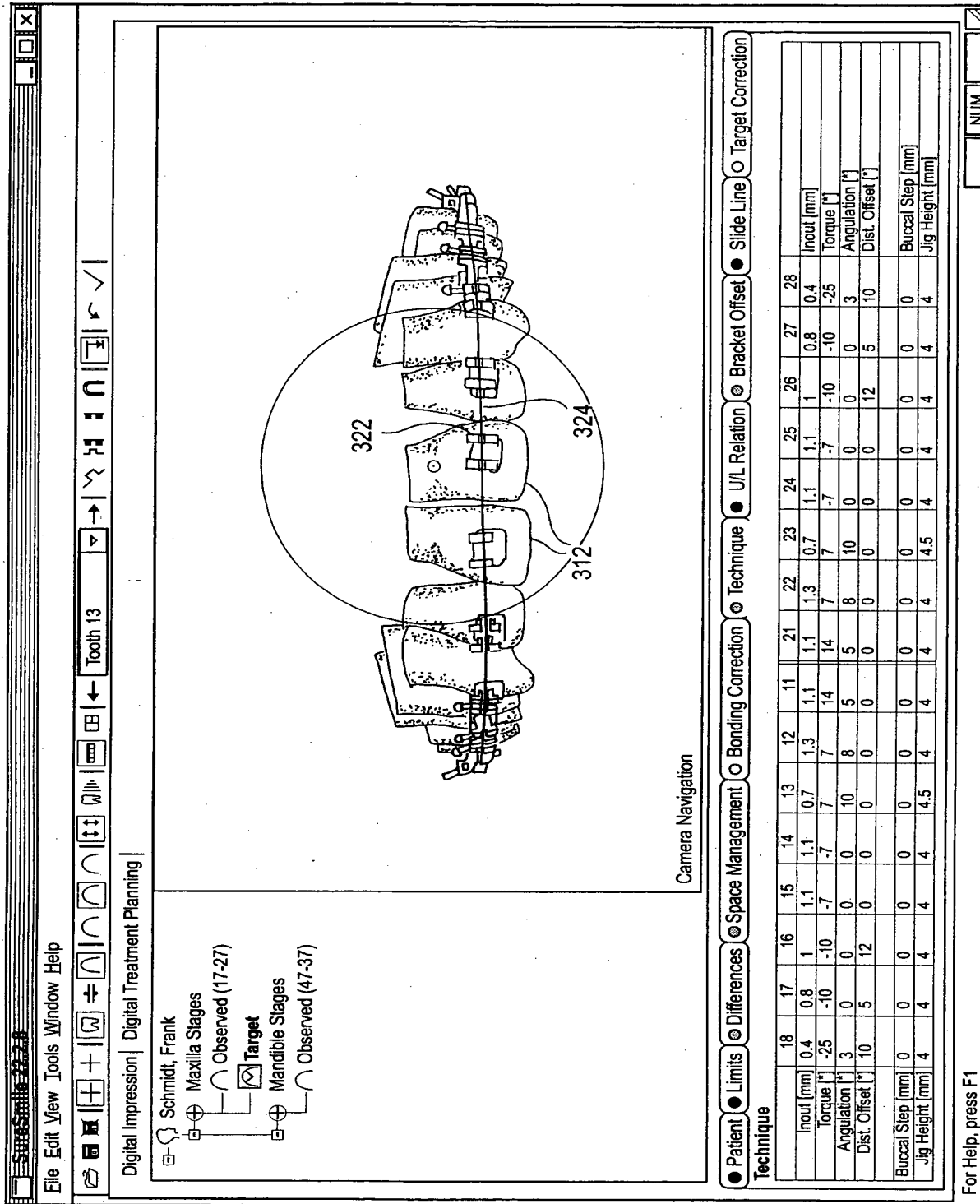


Fig. 64A

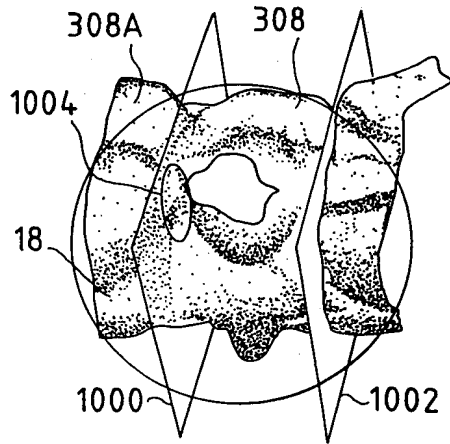


Fig. 64B

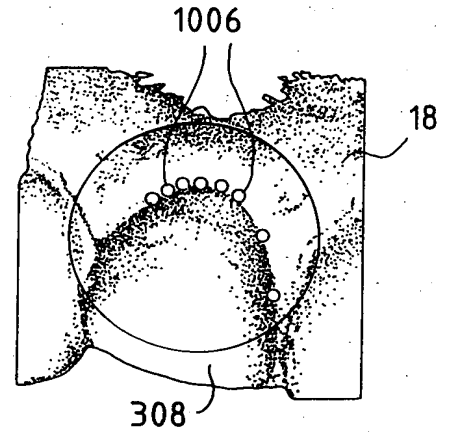


Fig. 64C

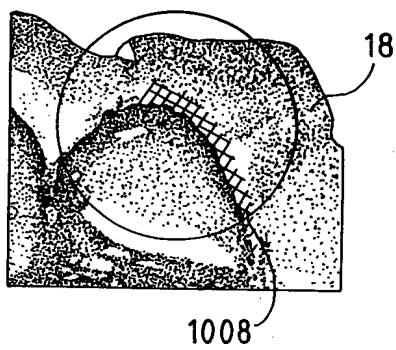


Fig. 64D

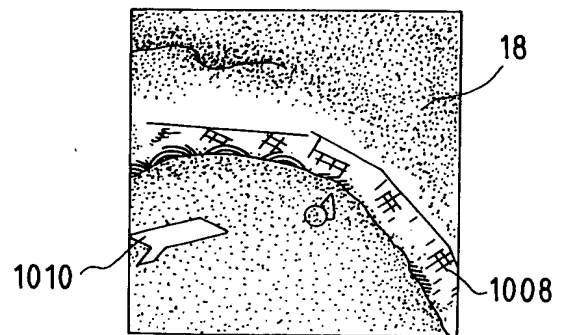


FIG. 65